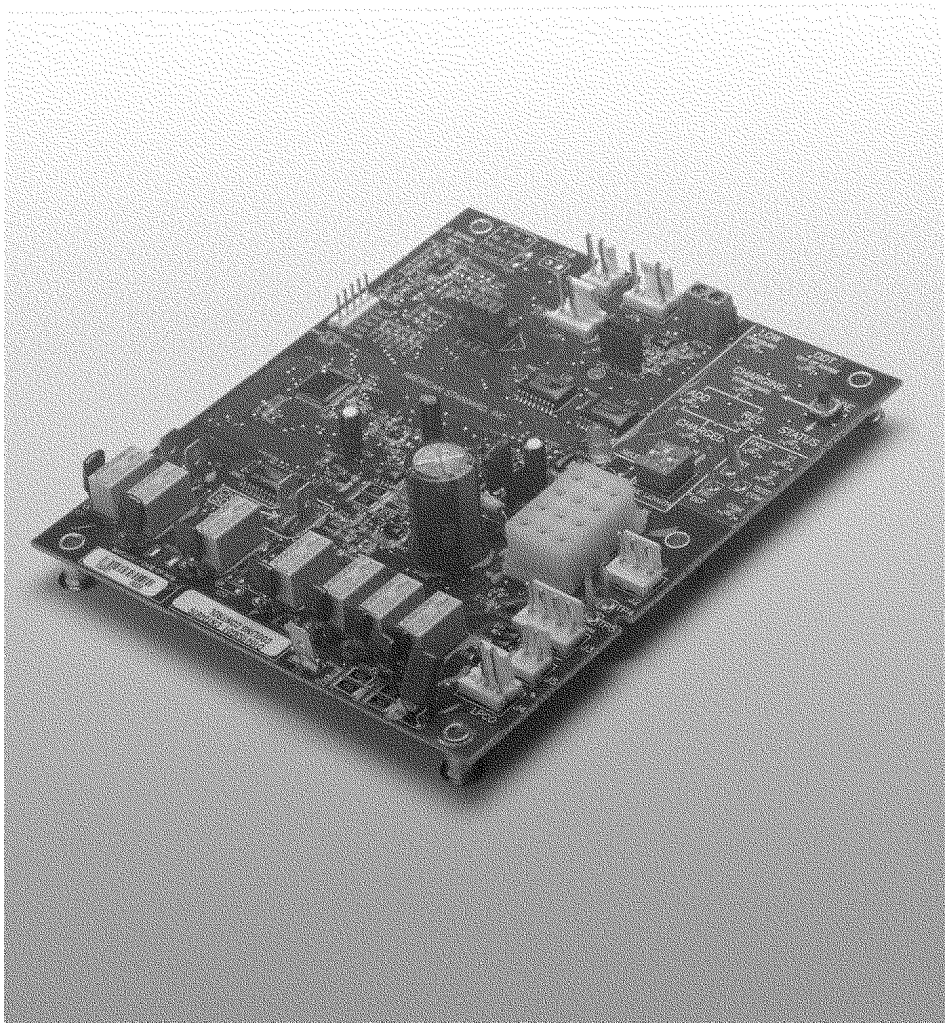
Communicating Controls Service Manual



Theory of Operation | Common Components
Sequence of Operation | Service/Troubleshooting

Table of Contents

Warnings and Cautions 2

Theory of Operation

Communicating Controls 3
Dehumidification Cycle 4
Communications 5
Equipment Setup 5
Alert Signaling 5
Approved Combinations 6
Alert Code Addendum 7

Low Voltage Wiring Diagram

Communicating Indoor and Communicating Outdoor Type 9
24 Volt Thermostat with a Communicating Air Handler and a Communicating Outdoor Unit converted to a 24 Volt Control using Harness Kit BAYACHP024A 10
Communicating Indoor and a Single Stage A/C Outdoor Unit 12

Common Components

User Interface Assembly 13
Personality Module 13

Variable Speed Indoor Blower Motor

Serial Port Communication 14

Three Stage Gas Furnaces

Features 15
Heating Cycle Checks and Limits 16
Inducer Motor Drive Board 17
Silicon Nitride Ignitor Learning Routine 18
IFC LEDs 19
IFC Inducer Motor Learning Routine Sequences 19
Fault Detection 19
Contingency Operating Mode 21
User Interface Display Navigation Tree 22
Gas Valve Adjustment Procedure 24
Unit Test Cycle 25
Venting Table 27
Sequence of Operation 28
Pressure Switch Testing 30
Pressure Switches Interconnecting Hoses 31
Pressure Switch Operating Pressure Chart 33
Furnace Trouble Shooting Checklist 34
Furnace Alert Code Addendum 36

Communicating Air Handler

Components 37
Communicating Mode Drawing 39
User Interface Display Assembly 41
Air Handler Sequence of Operation & LEDs Identification 42
Unit Test Mode 45
Fault LED and Error Code Addendum 46
Air Handler Trouble Shooting Checklist 47

Communicating Two Compressor Outdoor Units

Features 48
Charge Assist™ Control 49
Internal Refrigerant Piping 49
Field Refrigerant Piping 50
Duct Work 50
Low Ambient Cooling 50
Manual Charging Instructions 51
R-22 A/C Charging Charts 52
A/C Schematic Diagrams 52
R-22 H/P Charging Charts 54
H/P Schematic Diagrams 54
Charge Assist™ Sequence of Operation 56
Charge Assist™ LED Indications 56
Charge Assist™ Procedure Details 57
Charge Assist™ Tool BAYCAKT001AA 59
Charge Assist™ Procedure for a Non-Communicating 24 VAC Control System 60
Charge Assist™ LEDs Summary Chart 61
Charge Assist™ LED Flash and ERR Code Checklist 62

Trouble Shooting

GO/ NO GO Test for Serial V.S. Blower Motors 63
Quick Field Test of a Serial Port V.S. Blower Motor 65
Charge Assist™ Control Trouble Shooting 67
Charge Assist™ Control Fault LED Flash Code and Trouble Shooting Sequence 69
Outdoor Unit's Alert Code Addendum 73
Coil and Ambient Temperature Sensors Temperature/Resistance Table 74
Liquid Line Temperature Sensor Temperature/Resistance Table 75
Liquid Line Pressure Transducer DC Volts/PSIG Pressure Table 76
External Accessory Temperature Senor Temperature/Resistance Table 77
Error Code 91 78
Error Code 89, 91, and 126 (System Communicating Trouble Shooting) 88
Communicating System Voltage Readings 95

Note: This publication is general in nature and is intended for INSTRUCTIONAL PURPOSES ONLY. It is not to be used for equipment selection, application, installation, or specific service procedures.

All information contained herein is subject to change without notice.

Warnings and Cautions

Throughout this manual there are procedures where voltage may be present and gas or refrigerant system checks may be required. Read all cautions and warnings on this page before proceeding.

⚠ WARNING

SAFETY HAZARD

THIS INFORMATION IS INTENDED FOR USE BY INDIVIDUALS POSSESSING ADEQUATE BACKGROUNDS OF ELECTRICAL AND MECHANICAL EXPERIENCE. ANY ATTEMPT TO REPAIR A CENTRAL AIR CONDITIONING PRODUCT MAY RESULT IN PERSONAL INJURY AND OR PROPERTY DAMAGE. THE MANUFACTURER OR SELLER CANNOT BE RESPONSIBLE FOR THE INTERPRETATION OF THIS INFORMATION, NOR CAN IT ASSUME ANY LIABILITY IN CONNECTION WITH ITS USE.

⚠ WARNING

FIRE OR EXPLOSION HAZARD

FAILURE TO FOLLOW THE SAFETY WARNINGS EXACTLY COULD RESULT IN SERIOUS PERSONAL INJURY, PROPERTY DAMAGE, OR DEATH. IMPROPER SERVICING COULD RESULT IN DANGEROUS OPERATION, SERIOUS PERSONAL INJURY , PROPERTY DAMAGE, OR DEATH.

⚠ WARNING

SERVICE PROCEDURES HAZARD

BODILY INJURY CAN RESULT FROM HIGH VOLTAGE ELECTRICAL COMPONENTS, FAST MOVING FANS, AND COMBUSTIBLE GAS. FOR PROTECTION FROM THESE INHERENT HAZARDS DURING INSTALLATION AND SERVICING, THE ELECTRICAL SUPPLY MUST BE DISCONNECTED AND THE MAIN GAS VALVE MUST BE TURNED OFF. IF OPERATING CHECKS MUST BE PERFORMED WITH THE UNIT OPERATING, IT IS THE TECHNICIAN'S RESPONSIBILITY TO RECOGNIZE THESE HAZARDS AND PROCEED SAFELY.

⚠ WARNING

Voltage Hazard

Disconnect power to the unit before removing the blower door. Allow a minimum of 10 seconds for IFC power supply to discharge to 0 volts.

Failure to follow this warning could result in property damage, personal injury or death.

⚠ WARNING

CARBON MONOXIDE POISONING HAZARD

FAILURE TO FOLLOW THE SERVICE AND/ OR PERIODIC MAINTENANCE INSTRUCTIONS FOR THE FURNACE AND VENTING SYSTEM, COULD RESULT IN CARBON MONOXIDE POISONING OR DEATH.

⚠ WARNING

FIRE OR EXPLOSION HAZARD

SHOULD OVERHEATING OCCUR, OR THE GAS SUPPLY FAIL TO SHUT OFF, SHUT OFF THE GAS VALVE TO THE UNIT BEFORE SHUTTING OFF THE ELECTRICAL SUPPLY.

FAILURE TO FOLLOW THIS WARNING COULD RESULT IN PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH.

⚠ CAUTION

Safety Hazard

Sharp Edge Hazard

Be careful of sharp edges on equipment or any cuts made on sheet metal while installing or servicing. Personal injury may result.

Where there is no complete return duct system, the return connection must be run full size from the furnace to a location outside the utility room, basement, attic, or crawl space.

Do NOT *install return air through the back of the furnace cabinet.*

Do NOT *install return air through the side of the furnace cabinet on horizontal applications.*

NOTE:

Minimum return air temperature is 55°F.

⚠ CAUTION

CONTAINS REFRIGERANT!

SYSTEM CONTAINS OIL AND REFRIGERANT UNDER HIGH PRESSURE. RECOVER REFRIGERANT TO RELIEVE PRESSURE BEFORE OPENING SYSTEM.

Failure to follow proper procedures can result in personal illness or injury or severe equipment damage.

CAUTION

LABELING WIRES!

LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION. VERIFY PROPER OPERATION AFTER SERVICING.

⚠ CAUTION

BURN HAZARD

DO NOT TOUCH IGNITER. IT IS EXTREMELY HOT.

All information contained herein is subject to change without notice.

Communication Controls Theory Of Operation

The indoor thermostat, indoor unit, outdoor unit and other accessories communicate using two of the three thermostat wires required in this type of installation. The three wires are the; Data line (D), Common Line (B) and 24VAC Power Line. The indoor unit's transformer provides 24 Volt AC Power to itself and the thermostat. The outdoor unit has its own 24VAC transformer and will only require the Data Line and the Common Line for operation.

- Three wires needed between the indoor unit and thermostat (D, R, & B)
- Two wires needed between the indoor and outdoor unit (D & B).
- The communicating system is a microprocessor based system which operates as an open communications system. This type of control system can be expanded easily. When an additional item is added to the control system and powered up, such as a communicating IFD air cleaner, a Telephone Access Module "TAM" or a communicating humidifier, it will establish communications automatically with the other components in the system.
- Each component in the system has a pre-assigned electronic address.
- V.S. Indoor Blower Speeds are automatically set when the Outdoor Unit is a communication type. The Cooling CFM per ton, and the Heating CFM can be changed at the Air Handler or Gas Furnace User Inter Face display.
- When the system is operating, all operational messages and alerts will be sent on the data line to all communicating components in the system. All compatible components can read and send messages on the data line.
- The Air Handler or the Gas Furnace control will be the Bit Master in a communicating Comfort Control system. The Bit Master can be considered to be the system clock. It places timing pulses on the data line to indicate to the other connected devices exactly when their data bits can be transmitted on the data line bus.

All information contained herein
is subject to change without notice.

Communication Controls Theory Of Operation: 900 Series Comfort Control

The communicating system's comfort control is a true thermostat sensing indoor dry bulb temperature and relative humidity. When the thermostat senses the indoor air temperature or humidity has changed from the set point it will send an operational message on the data line. All units that are connected to the data line will read this operational message. The unit or units being called for will start and run on first stage; a gas furnace will start in the second stage of operation and then go back to the first stage of operation. The thermostat also sends blower speed information.

Operation is similar to a standard two-stage thermostat. When the indoor temperature does not move back towards the thermostat set point in a given time period or the temperature continues to move away from the set point the thermostat will change its operational message on the data line. The new message will be a call for the next stage of operation. When the indoor temperature moves back towards the set point the thermostat will again change its operational message on the data line and the units running will then go back to first stage of operation. When the indoor temperature is back to the set point temperature and the minimum run time for the equipment has been met, the thermostat will send another new operational message that the system is to shut down and any indoor blower off-delays will begin.

Indoor Dehumidification Control Cycle

When the indoor humidity in the cooling cycle is above the thermostat humidity set point, the thermostat message being sent can cause the system to continue to run to a maximum of three degrees below the thermostat set point. This will help control humidity under light loads conditions. This cycle is adjustable from 1 to 3 degrees in the Installer Setup Menu #0380 and #0383. Refer to Comfort Control Installer's Guide setup menu for complete menu.

- Minimum compressor run time is three minutes
- Minimum compressor off time is five minutes
- Frost Control cycle is used when a humidifier is installed and the control system has an outdoor temperature sensor installed. The frost control works by reducing the humidity level in the home when outdoor conditions can cause condensation or frost to form on windows. The factory setting is five. To reduce the condensation or frost on the windows, lower the number. If the humidity is too low in the home at the factory setting of five, increase the number. See advanced thermostat setup for programming setup instructions.

All information contained herein is subject to change without notice.

Reliable Communications

To insure that the message being sent by a component (ex. thermostat, indoor or outdoor unit) is not being over written by another components operational message, noise, or electrical interference, the sending component will monitor its own operational message on the data line. The message must match the original message. If the message does not match the sending components original message, it will stop sending its message and try again later. When a good operating message has been received by the indoor and the outdoor unit the system will begin to operate. The Indoor and Outdoor units use this operating message until a different operational message is received. This operating message is being sent repeatedly. If the system is running and the units do not receive a good operating message within four minutes the system will shut down. This four minute run time prevents the system from shutting down if a component receives a corrupted operating message. A corrupted message could be caused by two components sending a message at the same time, over written message, noise, or electrical interference noise on the data line. When commutations are reestablished the system will again operate.

Equipment Setup

When the system is powered up, the microprocessors in the thermostat, indoor unit, outdoor unit and other accessories will establish communications with each other. This is known as a plug and play system. A minimum amount of set up may be required at the indoor thermostat for approved equipment combinations and their accessories, reference page 6, Approved Combinations.

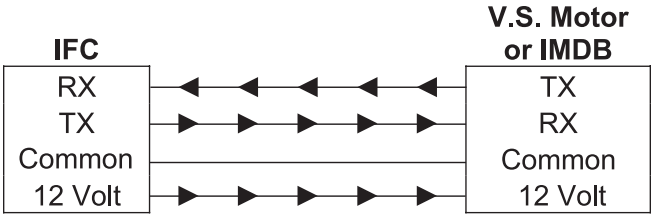
The information supplied by the outdoor unit is used by the indoor unit to set up the indoor blower airflow, CFM, and any delays needed. The thermostat uses the information from the indoor and outdoor units to configure the thermostat for the number stages of compressor operation, Air Conditioner or Heat Pump, type of heat - fossil fuel or electricity and number of stages of heat installed. No dip switches to set.

Fault Detection & Alert Signaling

The thermostat, indoor and outdoor units can provide notification of system faults. When a fault is detected by the indoor unit, outdoor unit, or thermostat a coded message is sent on the Data Line to the thermostat and will be displayed as an Alert. The thermostat will turn on the red Service LED and the display will switch back and forth between the main screen and an Alert screen.

The Alert screen will show the diagnostic Err code number. When multiple fault codes exist at the same time it will cycle through (up to 5 max) by showing the next code each time it comes to the diagnostic screen. The thermostat will not switch back and forth when on any other screen. The service LED will not be used for signaling emergency heat or anything else when the thermostat has received an Alert message.

Communication between Furnace IFC and V.S. Motor or Inducer Motor Drive Board



All information contained herein is subject to change without notice.

Clearing Alerts and Approved Combinations

Clearing Alerts

When a fault or faults are corrected and the faults are cleared at that unit's microprocessor, that microprocessor will quit sending the coded fault message. The thermostat will then turn off the red Service LED and quit switching the display back and forth between the normal display and the Alert screen display.

Approved Combinations

4H/3C HP, w/ 1 Aux, 1 EH, gas or electric
4H/2C HP, w/ 2 Aux, 2 EH, gas or electric
4H/1C HP, w/ 3 Aux, 3 EH, gas or electric
3H/3C HP, w/ 0 Aux, 0 EH
3H/2C HP, w/ 1 Aux, 1 EH, gas or electric
3H/1C HP, w/ 2 Aux, 2 EH, gas or electric
2H/2C HP, w/ 0 Aux, 0 EH
2H/1C HP, w/ 1 Aux, 1 EH, gas or electric
1H/1C HP, w/ 0 Aux, 0 EH
3H/3C conventional, gas or electric
2H/3C conventional, gas or electric
1H/3C conventional, gas or electric
0H/3C conventional
3H/2C conventional, gas or electric
2H/2C conventional, gas or electric
1H/2C conventional, gas or electric
0H/2C conventional

The following sequence of operation will occur when there are more stages of heat installed than the approved combinations list above shows. Example: When a two stage heat pump is installed with a three stages gas furnace the thermostat can only call for two stages of auxiliary heat, as shown above. When the thermostat calls for first stage auxiliary heat the furnace IFC will operate the furnace in the second stage of heat. When the thermostat calls for second stage auxiliary heat, the furnace IFC will operate the furnace in the third stage of heat.

All information contained herein
is subject to change without notice.

*Alert Code Addendum*③

Alert Code	Alert Group	Communicating Equipment			Alert Notification				Alert Description
		Air Handler	Furnace	Outdoor Unit	Comfort Control	User Interface Display	Fault LED	COM LED	
1	Pressure Switch Failure		X		N/A	PS3 OPEN	3 Flash	Device count	Open Pressure Switch, third stage
						PS3 CLOSED			Shorted Pressure Switch, third stage
						PS2 OPEN			Open Pressure Switch, second stage
						PS2 CLOSED			Shorted Pressure Switch, second stage
						PS1 OPEN			Open Pressure Switch, first stage
						PS1 CLOSED			Shorted Pressure Switch, first stage
4	Low Flame Signal		X		N/A	LO FLAME SNS	8 Flash	Device count	Flame current is low, but still strong enough to allow operation.
10	Ignition Means Fault		X		ERR 10	IGNITER ERR	6 Flash	Device count	Igniter fault
						TRIAC ERR			Triac fault
18	Control Failure	X			ERR 18	CNTRL FAULT †	Solid ON ‡	N/A	Internal Control Error
18	Control Failure		X		ERR 18	CNTRL FAULT	Solid ON	Device count	Internal control failure
19	Twinning Fault	X			N/A	TWIN ERROR	8 Flash	N/A	Air Handler Twinning Error
19	Twinning Fault		X		N/A	TWIN ERROR	None	Device count	Twinning Not Allowed with Variable Speed
20	Flame lost or Ignition failure		X		N/A	RECYCLE	2 Flash	Device count	Flame is off when flame should be detected. Furnace tries to relight itself.
						RETRY			Furnace tries to light, but no flame is detected.
22	Soft lockout due to flame lost or ignition retries		X		ERR 22	RECYCLE LO	2 Flash	Device count	10 recycles within a single call for heat will cause 1hr lockout.
						RETRY LO			3 ignition attempts in a row within a single call for heat results in 1 hr lockout.
26	High Temp Limit Fault		X		ERR 26	AUX LIMIT	4 Flash	Device count	Open Reverse Flow - Heat exchanger temperature too high. Could be caused by low airflow or fan failure.
						HIGH LIMIT			
						IND LIMIT	9 Flash		Open High Limit - Heat exchanger temperature too high. Could be caused by low airflow or fan failure.
27	Replace Device				ERR 27	N/A	N/A	N/A	The device needs to be replaced
33	Line Polarity Fault		X		N/A	POLARITY ERR	6 Flash	Device count	Voltage reverse polarity
34	Flame Detect Fault		X		ERR 34	FLAME ERROR	5 Flash	Device count	Flame detected, should not be present
35	Zoning Fault *				ERR 35	N/A	N/A	N/A	Duplicate zone - Another zone is present with the same zone number
37	Duplicate Filter *				ERR 37	N/A	N/A	N/A	Another air filter timer is present.
38	Duplicate Humidifier Pad *				ERR 38	N/A	N/A	N/A	Another humidifier pad timer is present.
39	Duplicate Humidity Sensor *				ERR 39	N/A	N/A	N/A	Another humidity sensor is present.
50	Duplicate OD Temp			X	None	N/A	15 Flash	N/A	Duplicate OD temperature sensor
52	Discharge Air Sensor Fault	X			N/A	DAS SHORT *	5 Flash *	N/A	Discharge Air Sensor Short Error
						DAS OPEN *			Discharge Air Sensor Open Error
53	Faulty Outdoor Sensor				ERR 53	N/A	N/A	N/A	There is a faulty outdoor temp sensor
54	Faulty Humidity Sensor				ERR 54	N/A	N/A	N/A	There is a faulty humidity sensor
59	AC Line Fault		X		N/A	AC VOLTS LOW	None	Device count	Voltage too low
						AC VOLTS HI			Voltage too high
67	Temp Sensor Fault			X	ERR 67	N/A	5 Flash	N/A	Ambient Temperature Sensor Fault (Out of Range - Open or Shorted)
							6 Flash		Coil Temperature Sensor Fault (Out of Range - Open or Shorted)
					None		11 Flash		Liquid Temperature Fault (Out of Range - Open or Shorted)
							13 Flash		External ODT Sensor Fault (Out of Range - Open or Shorted)
68	Defrost Fault			X	None	N/A	2 Flash	N/A	Defrost Fault A
							3 Flash		Defrost Fault B and/or C
							4 Flash		Defrost Fault A and (B and/or C)
79	LPCO Fault			X	ERR 79	N/A	7 Flash	N/A	LPCO Fault (Open outside of defrost Cycle)
87	Roll Out Fault		X		ERR 87	ROLLOUT OPEN	4 Flash	Device count	Open flame rollout
88	Ground Fault		X		N/A	GND FAULT	6 Flash	Device count	Occurs when proper earth ground is not detected.
89	Equipment Missing				ERR 89	N/A	N/A	N/A	Expected equipment is not reporting
90	Communication Busy Fault		X		N/A	SYS COMM CRC	10 Flash	Fast Flash	Comm system unrecognized response
						IND COMM CRC			Inducer Motor unrecognized response
						BLW COMM CRC			Blower motor unrecognized response
90	Communication Busy Fault	X			N/A	SYS COMM CRC	3 Flash **	Fast Flash	COMM System Busy Error
					N/A	BLW COMM CRC	3 Flash	N/A	Serial Motor Communication Busy Error
90	Communication Busy Fault			X	ERR 90	N/A	1 Flash	N/A	Excessive Communication CRC Errors
90	Communication Busy Fault				ERR 90	N/A	None	N/A	Comm line busy and no idle has been detected.
91	Communication Inactive Fault	X			ERR 91	NO SYS CLK	3 Flash **	Fast Flash	COMM Bit Master Clock Error
						SYS COMM ERR	3 Flash **	Fast Flash	COMM Heat/Cool Demand Error
						BLW COMM ERR	3 Flash	N/A	Serial Motor Communication Inactive Error①
91	Communication Fault		X		ERR 91	BLW COMM ERR	10 Flash	Fast Flash	Blower motor no Comm response①
						IND COMM ERR			Inducer motor no Comm response
						SYS COMM ERR			Loss of heat/cool demand
						NO SYS CLK			Loss of clock signal
91	Communication Fault			X	ERR 91	N/A	1 Flash	Fast Flash	No Communication
					ERR 91	N/A	1 Flash	Fast Flash	Loss of Clock Signal
91	Communication Fault				ERR 91	N/A	None	N/A	Comm line is dead and no bits have been received.

All information contained herein
is subject to change without notice.

*Alert Code Addendum*③

Alert Code	Alert Group	Communicating Equipment			Alert Notification				Alert Description
		Air Handler	Furnace	Outdoor Unit	Comfort Control	User Interface Display	Fault LED	COM LED	
92	Fuse		X		N/A +	CHECK FUSE	None	N/A	24V Fuse Open
92	Fuse Failure	X			N/A +	CHECK FUSE †	Solid ON ‡	N/A	24V Fuse Open Error
93	Gas Valve Fault		X		ERR 93	EXT GV ERR	7 Flash	Device count	Control senses 24V present at the gas valve when it should not be present.
							Solid ON		Control tried to turn on gas valve, but 24V not sensed.
						INT GV ERR			Control senses 24V present at the gas valve when it should not be present.
101	Y1 Relay Failure		X		ERR 101	Y1 OFF ERR	None	Device count	Y1 Output OFF when it should be ON
						Y1 ON ERR			Y1 Output ON when it should be OFF
101	Y1 Relay Fault	X			ERR 101	Y1 ON ERR	7 Flash	N/A	Y1 Relay Stuck Closed Error
						Y1 OFF ERR			Y1 Relay Stuck Open Error
102	Y2 without Y1 - Miswire (24V mode only)			X	None	N/A	10 Flash	N/A	Y2 without Y1 - Miswire (24 volt mode only)
104	Heater Relay Fault	X			ERR 104	HT ON ERR	4 Flash	N/A	Heater Relay Stuck Closed Error
	Heater Relay Fault	X			ERR 104	HT OFF ERR	4 Flash	N/A	Heater Relay Stuck Open Error
105	Heater Interlock Relay Fault	X			ERR 105	HT+LK ON ERR	4 Flash	N/A	Both Interlock Relay & Heater Relay Stuck Closed Error
					ERR 105	INTLK ON ERR	4 Flash	N/A	Interlock Relay Stuck Closed Error
					ERR 105	NTLK OFF ERR	4 Flash	N/A	Interlock Relay Stuck Open Error
106	External Shutdown Fault	X			ERR 106 *	EXT SW OPEN *	1 Flash *	N/A	External Shutdown Input Open Error
110	Return Air Sensor Fault	X			N/A	RAS SHORT *	6 Flash *	N/A	Return Air Sensor Short Error
						RAS OPEN *			Return Air Sensor Open Error
113	Liquid Pressure Sensor Fault			X	None	N/A	12 Flash	N/A	Liquid Pressure Sensor Fault (Out of Range - Open or Shorted)
114	PM Bad or Missing Fault	X			ERR 114	N/A	2 Flash	N/A	PM Data Corrupt Error
						N/A			PM Missing Error
						ID MTR ERR			Motor Mismatch Error
					N/A	PM UNIT ERR			PM Unit Data Error
						CAP MISMATCH			Compressor Capacity Mismatch Error
						PM DATA ERR			PM Data Section Error
114	Bad or Missing PM		X		N/A	PM DATA ERR	None	Device count	Data Section is Corrupt but PM is useable
						CAP MISMATCH			Compressor size does not match capacity in PM
					ERR 114	ID MTR ERR			Blower HP/OEM does not match PM Data
						PM MISSING			No PM
					N/A	PM UNIT ERR			Primary Copy of Unit Data File is Corrupt.
					ERR 114	PM MEM ERROR			Primary and Secondary copies of Unit Data File are Corrupt
114	Bad or Missing PM			X	ERR 114	N/A	14 Flash	N/A	PM Data Corrupt Error or PM Missing Error
					N/A				PM Unit Data Error or PM Data Section Error
117	Return Air Temperature Fault	X			N/A	RAS RNG ERR *	6 Flash *	N/A	Return Air Temperature Range Error
118	Discharge Air Temperature Fault	X			ERR 118 *	DAS RNG ERR *	5 Flash *	N/A	Discharge Air Temperature Range Error
						DAS UL ERR *			Discharge Air Temperature Upper Limit Error
						DAS LL ERR *			Discharge Air Temperature Lower Limit Error
119	Temperature Sensor Failure		X		N/A	TS 1 SHORT	None	Device count	Temperature sensor 1 shorted.
						TS 1 OPEN			Temperature sensor 1 open.
						TS 2 SHORT			Temperature sensor 2 shorted.
						TS 2 OPEN			Temperature sensor 2 open.
123	Demand Configuration Fault	X			N/A	DEMAND ERR *	9 Flash	N/A	Heat/Cool Demand Conflict Error
						HT CFG ERR		N/A	Electric Heat Configuration Error
126	Equipment Change Alert				ERR 126	N/A	N/A	N/A	Equipment does not match valve stored at startup②

Notes:

† If Air Handler processor is reset or fuse is open, COMM Alert cannot be reported; if the processor is reset the User Interface will not be updated
* Alert flash code will not be implemented for initial release
** COMM communication errors may also be flashed on Fault LED
‡ LitePort™ transmissions will be allowed during ON flash codes
\+ Fuse alert notification level would show on Comfort Control, but when fuse is open the COMM bus has no power

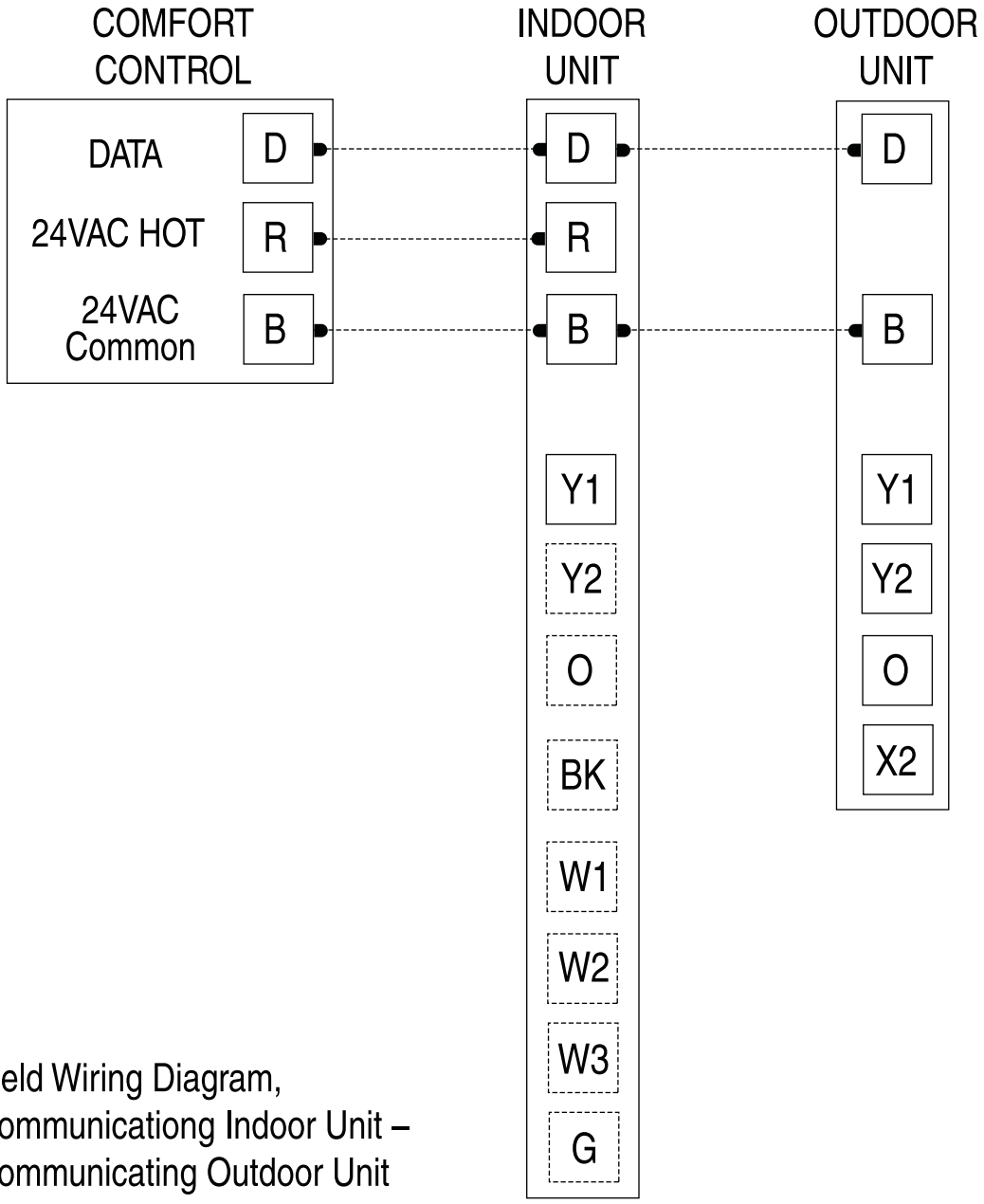
Notes: None

Notes: 4 highest priority Faults display flash codes sequentially. 2 second pause between faults and 4 second pause between sequences. Cycle power to ODU to clear Faults.

Notes:
① Comfort Control will switch to "OFF" until this fault condition clears.
② A device has changed since auto discovery (see Installer Guide ISU 0706 to reset)
③ Pub. No. 18-HD32D2-2, Revision 3, 08/07/2007

All information contained herein is subject to change without notice.

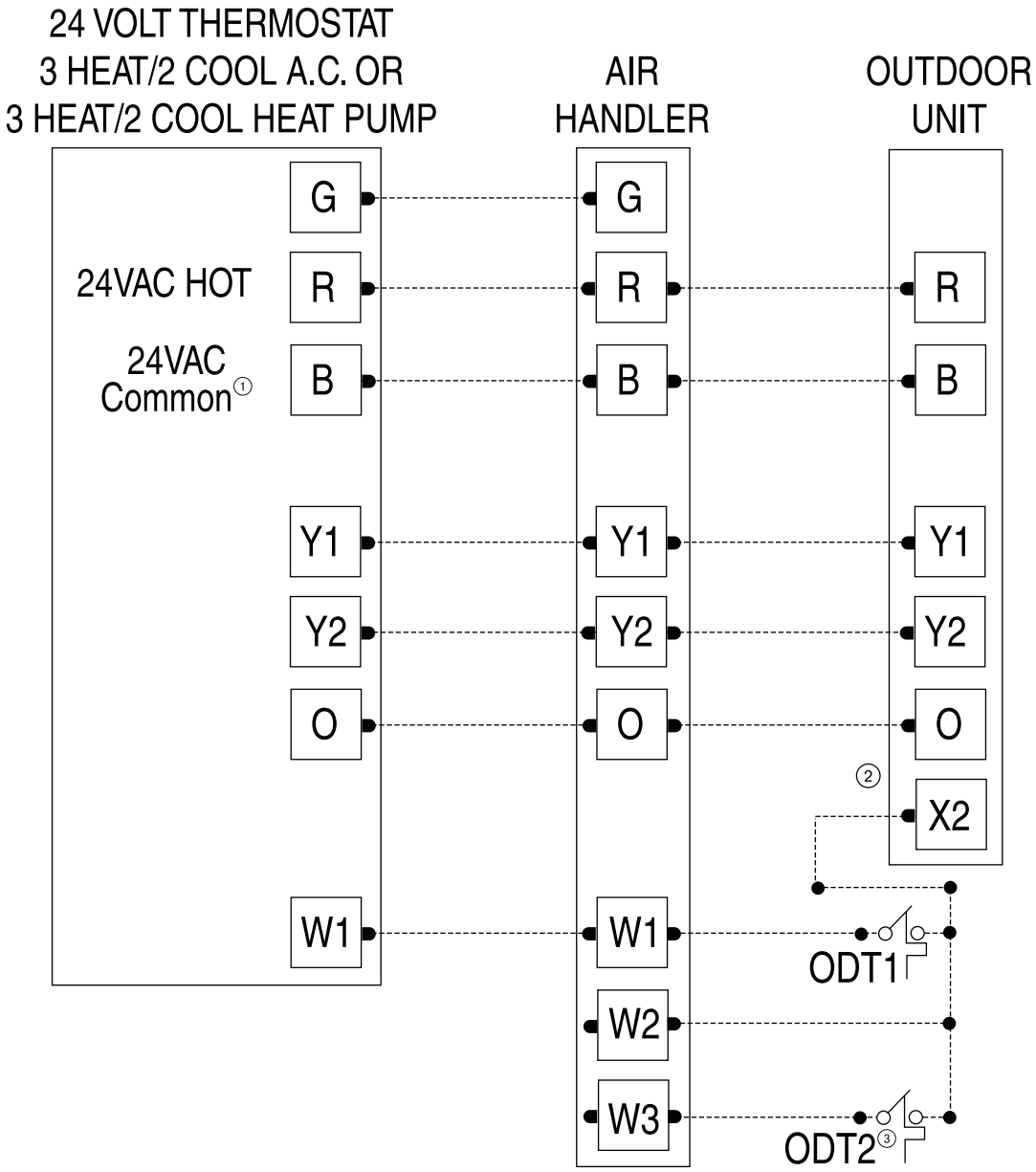
Communication Controls Theory Of Operation: With Communicating Outdoor Unit



Field Wiring Diagram,
Communicationg Indoor Unit –
Communicating Outdoor Unit

All information contained herein
is subject to change without notice.

24 Volt Thermostat with a Communicating Outdoor Unit Using a 24V Harness Kit #BAYACHP024A



Notes:

① 24 Volt Common B may not be required at the thermostat.

② 0 and X2 Thermostat wires are used on heat pumps installations only.

③ ODT2 not required on a two stage auxiliary electric heater.

All information contained herein is subject to change without notice.

24 Volt Thermostat with a Communicating Outdoor Unit Using a 24V Harness Kit #BAYACHP024A

For instructions, components and diagrams used in this kit, order kit #BAYACHP024A. Shown here is an excerpt from the kit for reference:

1. Be certain power to unit is **DISCONNECTED**.

2. Remove cover panel on control box compartment.

3. Disconnect and remove the existing communicating control harness assembly. This harness consists of the 4 wire plug assembly (J1). Disconnect/remove: the red wire and fuse assembly from the transformer; the blue lead from the transformer; the green/yellow transformer ground wire; the brown wire going out to field connections; the blue wire going out to field connections and the double blue wire connection terminal at the lo contractor coil.

   Also disconnect and remove the two transformer primary wires; brown/red wire coming from the start capacitor and the black/blue wire coming from the hi contractor. The transformer is no longer used and should be removed.

4. Connect the 24 volt harness (supplied with the kit) to the control board, where the communicating harness was removed (connector J1). Take the double blue lead terminal and connect to the lo contractor coil, where the previous blue lead was removed. Route the remaining yellow, blue, orange, red, black, and yellow/red wires out for field connection, as shown.

   If the unit is a cooling only model (not a heat pump), the orange and black leads will not be used and should be capped off.

   The table below defines maximum total length of low voltage wiring from the outdoor unit to the indoor unit, and to the Comfort Control.

NEC Class II Wiring, 24 Volts

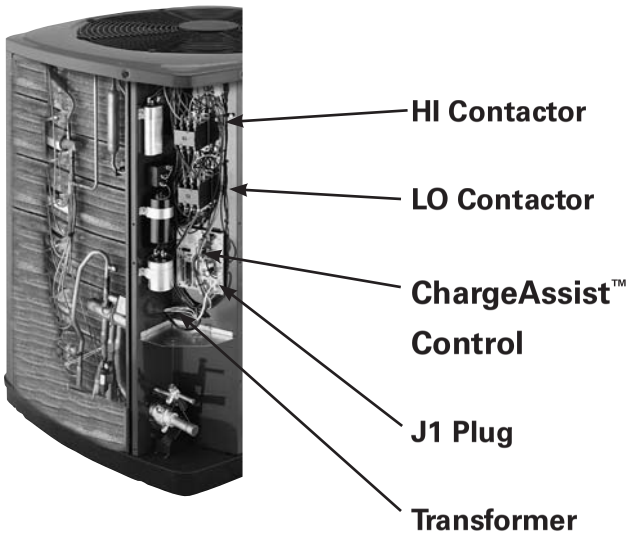
Wire Size	Max Wire Length
18 AWG	150 FT.
16 AWG	225 FT.
14 AWG	300 FT.

5. Place the proper wiring diagram over the existing unit wiring diagram.
   If the unit is a:
   - 30,000 BTU heat pump, use D154942
   - 36,480 or 60,000 BTU heat pump, use D154944
   - 30,000 BTU cooling only model, use D154652
   - 36,000, 48,000 or 60,000 BTU cooling only models, use D154657

6. Replace the control compartment cover panel.

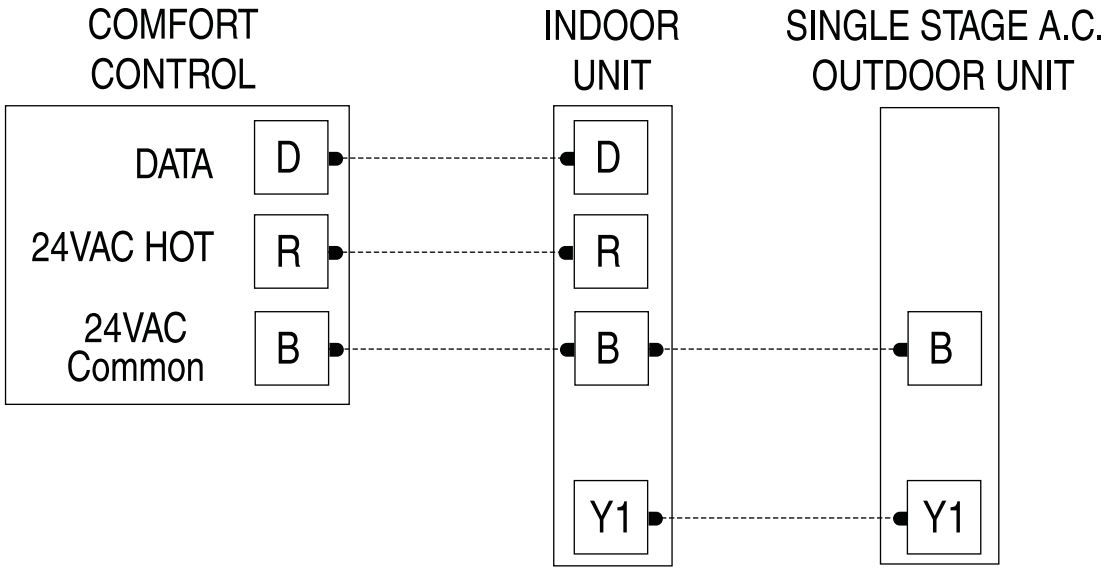
7. Reconnect power, which was disconnected in step #1.

8. Please retain communication harness and transformer for possible future use.



All information contained herein
is subject to change without notice.

Comfort Control with a Single Stage 24 Volt Controlled A.C.

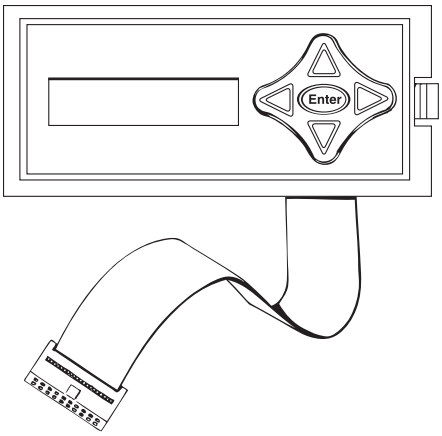


Field Wiring Diagram,
Communicationg Indoor Unit –
Non-Communicating A.C. Outdoor Unit

All information contained herein
is subject to change without notice.

Gas Furnace and Air Handler Common Components

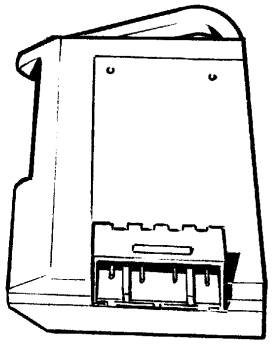
User Interface Assembly



The indoor User Interface Assembly will display the model and serial number during normal unit operation. In addition, the following information can also be accessed through the display.

- The Units Model & Serial Number (Normal Display)
- System Status (Mode of Operation; Heating Stage 1, 2 or 3, Cooling Stage 1, 2 or 3, or OFF, thermostat not calling)
- Requested Airflow (CFM) when the thermostat is calling.
- Indoor Unit's Alert Codes
- Unit Test Cycle (Heating Cycle Only)
- Blower Motor Speed (RPM when operating)
- Fossil Fuel Draft Inducer Speed (RPM when operating)
- Last Four Alerts
- Replacement Part List
- Personality Module Serial Number
- Stand alone operation, without a thermostat: Duty Cycling of gas equipment (Contingency Mode)
- Exit

Personality Module



The communicating microprocessor controls in the indoor and outdoor units have a Personality Module plugged onto their control. The Personality Module (PM) contains the following system specific information:

- Type of indoor unit, air handler or gas furnace,
- Variable speed or four speed indoor blower and horsepower of blower
- The number of stages of heat
- Type of the outdoor unit, AC or HP
- Number of compressor stages, 1, 2 or 3
- Size of the outdoor unit
- Indoor Air Flow and Delays
- Alerts

The stored information is downloaded into the unit's controller when the unit is powered up. This information is sent to other microprocessor controls connected to the Data Line.

Note: Do not remove the Personality Module (PM) from its control board; it is model number and serial number specific to this unit.
If the PM is unplugged from its control board after the system is powered up, the system will continue to operate.

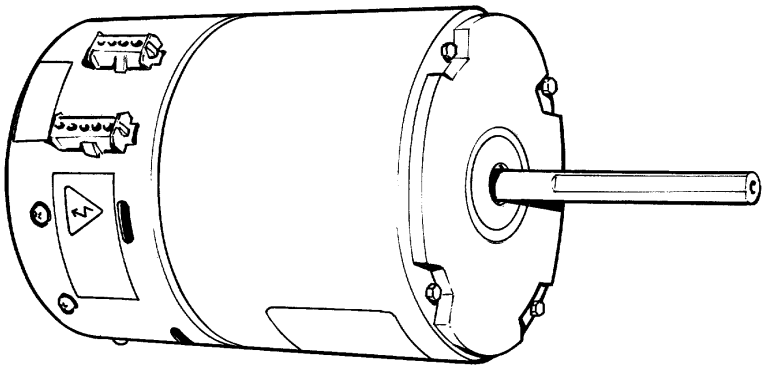
If the PM is not plugged back onto the control board, an ERROR message will be displayed at the thermostat.

24VAC Fuse

The on-board 24VAC automotive type fuse is in series with the 24VAC terminal (R). If the fuse opens, the control's microprocessor remains powered. If the system is running it will shut down all operation. A gas furnace's gas valve or an air handler's auxiliary heat will turn off at once and there will be a several second delay before the gas furnace's Inducer motor and indoor blower is shut down. The User Interface Assembly will display CHECK FUSE when the last four faults are displayed.

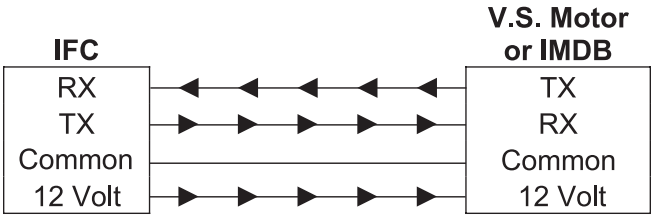
All information contained herein
is subject to change without notice.

Variable Speed Indoor Blower Motor Operation



Serial Port Communication

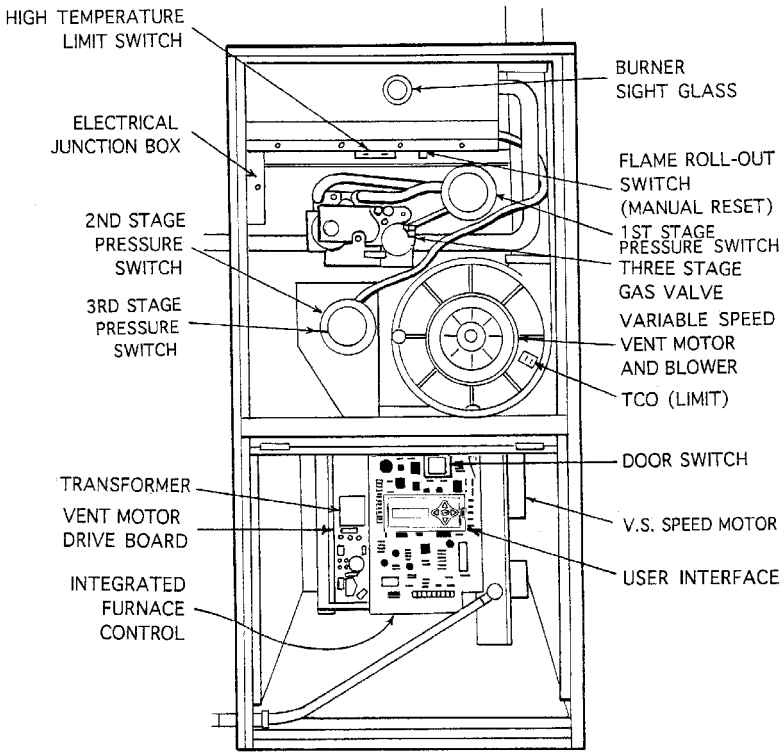
The Serial Port Communication type of variable speed motor operates the same as the 24 volt controlled V.S. type except the on/off control and speed signals are now a digital command signal. The Motor module receives the command signal and replies back to the indoor product control board. This type of motor module is not preprogrammed at the factory. The horsepower, operating speeds, maximum RPM and direction of rotation information are stored in the Personality Module, which is located on the Gas Furnace Control (IFC) or an Air Handler Control (AHC). When the system is powered up, the V.S. Motor programming information stored in the Personality Module is sent to the V. S. Motor module. The Serial Port Communication V.S. Motor has four low voltage wires plugged into it. The four wires are; (1) The TX wire which is used to send all digital information, (2) The RX wire which is used to receive all digital information, (3) 24 Volt AC and DC common wire, and (4) 12 Volt DC wire. The 12 volts are supplied by the IFC or AHC control and used to power the input and output circuits, optic-couplers, in the V.S. Motor.



Single phase 120 or 240 volts AC power is applied to the motor module and IS NOT turned on or off by the IFC or AHC. The V.S. Motor module converts the AC power to DC power. Some of the DC voltage is reduced to power the microprocessor inside the V.S. Motor module. A communication fault will appear if line voltage is removed from the V.S. Motor module and the IFC or AHC system is then repowered. When blower operation is called for, the V.S. Motor module turns the DC power on and off to each leg of its three phase motor in a rotating manner. The V.S. Motor Module will increase the voltage and number of Hertz it applies to its three phase motor to increase its speed, or decrease the voltage and Hertz to slow it down. The V.S. Motor module monitors the motor's RPM and power and compares this information to its programmed information. If the RPM and power do not align with the programmed information, the V.S. Motor module will change its output voltage and Hertz to bring the airflow back in line with its program.

All information contained herein
is subject to change without notice.

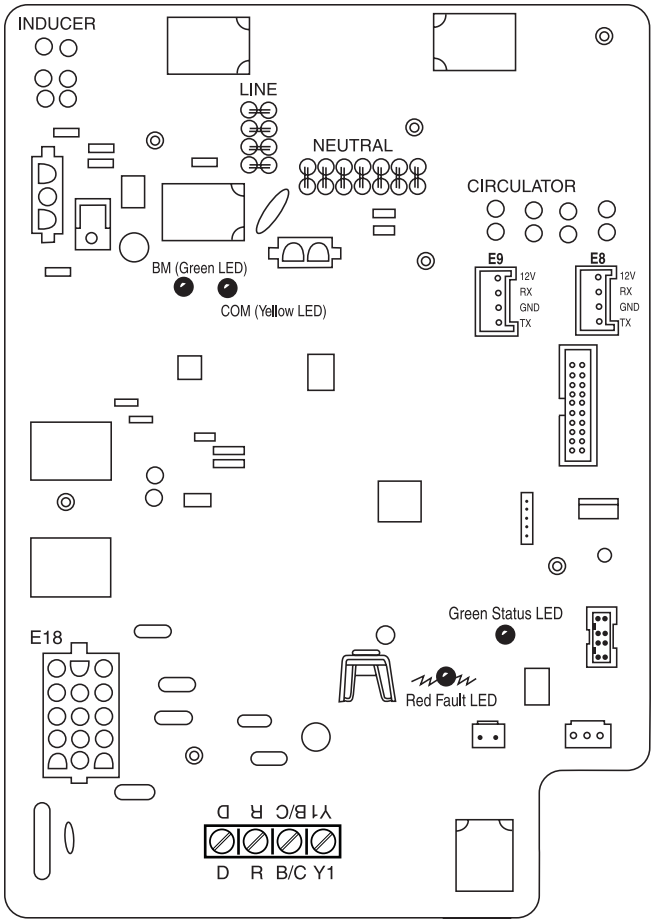
Three-Stage Gas Furnace



Features

- Three Stages of heat provide better comfort control
  - o 1st Stage – 40% –Typical Input
  - o 2nd Stage – 65% –Typical Input
  - o 3rd Stage – 100% –Typical Input
- Communicating Control System equals; simple installation, limited diagnoses at the thermostat, greater diagnoses capabilities at the Furnace's User Interface Module.
- System operation and set point changes can be done via telephone with a Telephone Access Module, when installed.
- Variable speed operation of the 3 Phase Inducer Motor will allow furnace operation with up to 200 equivalent feet of vent pipe and pipe fittings.
- Variable Speed Indoor Blower will provide more efficient operation while maintaining rated airflow over a greater range of conditions.
- Has a Heating Test Cycle which will cycle the furnace through it three stages of heat rapidly.
- Capable of stand alone operation (Contingency Mode) duty cycling of heat.
- Convertible to Propane Gas (change orifices only). Operates on Propane at 3.5" manifold pressure.
- To ensure the furnace's heating efficiency, the furnace IFC will go through a RESET to the Inducer's Motor's learning routine after :
  - o 150 Cycles in First Stage Heat
  - o 100 Cycles in Second Stage Heat
  - o 50 Cycles in Third Stage Heat
  - o Or whenever power is interrupted to the furnace and is then restored
- The furnace IFC communicates the following information with the Indoor V.S. Blower Motor:
  - o Rotation Direction
  - o Speed & Max CFM
  - o Start & Stop Commands
- Also Checks the V.S. Motor horsepower (HP) and will send an error message if HP is not correct.
- The furnace IFC controls the Heating Cycles CFM, all other airflows are controlled by the comfort control thermostat.
- Silicon Nitride Hot Surface Igniter.
  - o IFC uses the proven Adaptive Learning Routine providing reliable ignition and prolonging the life of the Hot Surface Igniter
- ComfortR™ indoor blower Ramp cycle and cooling airflows are set at the comfort control thermostat. No Dip Switches to set.
- Heating V.S. Indoor Blower Motor time delay to off selectable at the User Interface Module.
- These furnaces can only be controlled by a communicating comfort control.
- The thermostat and furnace communicate digitally with each other. The Data and Common thermostat wires are used for communications.
- The furnace provides 24 Volts A.C. power to operate the thermostat.

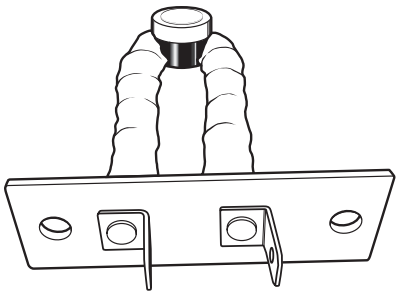
All information contained herein is subject to change without notice.



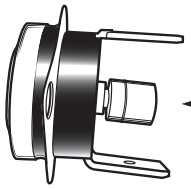
IFC Control / Part # Cnt 04836

Heating Cycle

The Furnace Integrated Furnace Control, IFC, receives a message from the comfort control thermostat to operate in the first, second or third stage of heat.

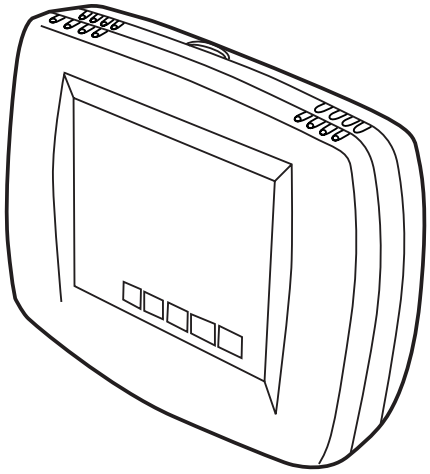


Primary Limit



Manual Reset Button

Manual Reset Flame Roll-Out Limit



Comfort Control Thermostat

Checks Performed Before Starting a Heating Cycle

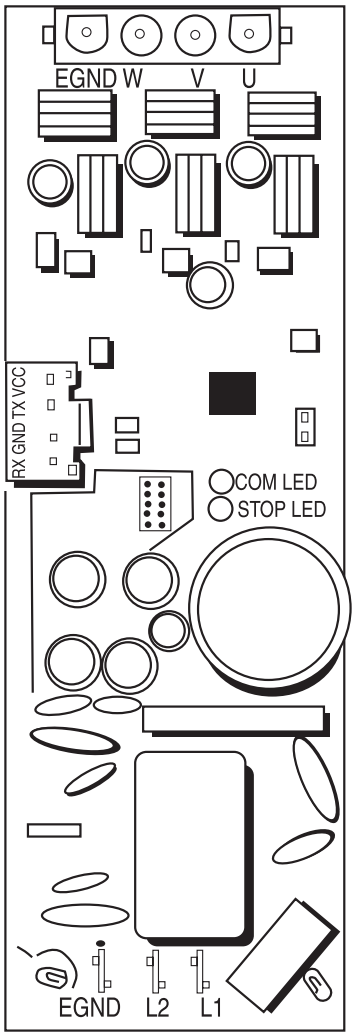
The furnace's IFC will check to see if all of the limits are closed and the pressure switches for stage one (PS-1) and stage two (PS-2) are open. These operating components are always checked before a heating cycle can begin. Stage three (PS-3) pressure switch is not checked until a call for third stage heat is received by the furnace's IFC. The furnace's IFC will always start the heating cycle in the Second Stage of heat and then goes to First Stage heat, or whatever stage the comfort control thermostat is calling for.

The furnace's IFC then communicates digitally with the Inducer Motor Drive Board (IMDB) and the Variable Speed Indoor Blower (VSIB). The furnace IFC signals the IMDB and the VSIB on its Transmit Line and receives replies from these components on its Receive Line.

The three phase Inducer Motor speed is controlled by the output Voltage Level and the number of AC Cycles, hertz, supplied by the IMDB. When the inducer's motor speed changes are needed the furnace's IFC will signal the IMDB which will change its output voltage and number of hertz. An increase in voltage and an increase in the number of hertz from the IMDB will cause the inducer motor to run faster.

All information contained herein is subject to change without notice.

3Ø Power Output To Inducer Motor



VCC = 12 VDC Input
TX = Data Output
GND = Ground/Common
RX = Data Input

Power Plug
120 V.A.C. Input

Inducer Motor Drive Board LED'S

Communication, COM, LED Green

COM LED ON = No Call For Inducer Motor

COM LED FLASHING = Call For Inducer Motor Operation

STOP LED OFF/ON = Only Flashes When IFC Signals Inducer Motor Drive Board To Turn Off.

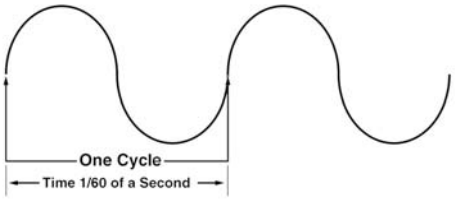
Note #1
When IMDB & IFC are not communicating the User Interface will display no data when inducer RPM is selected.

All information contained herein is subject to change without notice.

Silicon Nitride Ignitor Learning Routine

The ignitor is constructed of a tungsten heater element and silicon nitride ceramic insulators. The voltage rating of the ignitor is 80 volts R.M.S., which is less than the line voltage applied to the furnace; therefore, the control will reduce the number of cycles it supplies to the SiNi ignitor per second. The control checks the line voltage constantly and when a call for heat is received the control sets the number of cycles it is going to supply to the ignitor based on the line voltage it is reading. This reduced number of AC sine wave cycles per second reduces the effective voltage, R.M.S, applied to the SiNi ignitor per second. If the line voltage is low, the number of cycles will go up, or if the line voltage is high, the number of cycles is reduced.

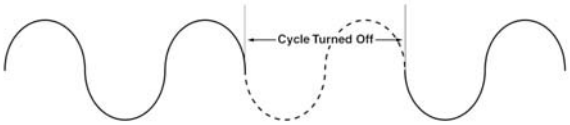
60 Hertz AC Sine Wave



Number of cycles per second affects the effective voltage or voltage R.M.S.

R.M.S. = Root—Mean—Square = The value assigned to an alternating current or voltage that results in the same power dissipation in a fixed resistance as DC current or voltage of the same numerical value.

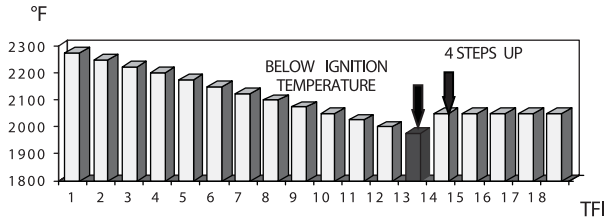
One or more cycles are turned off by the I.F.C. control to control the R.M.S. voltage supplied to the silicon nitride ignitor.



Learning Process

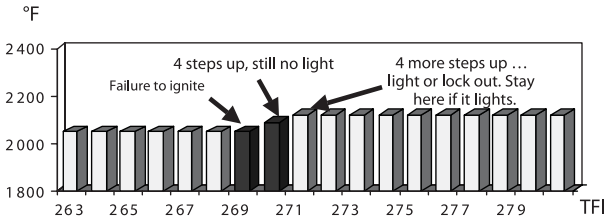
After each successful ignition, the number of AC sine wave cycles are reduced. The lower number of AC sine waves reduces the effective voltage applied to the ignitor, and this lowers it's maximum temperature.

After each successful ignition attempt, the burner lights, then the number of cycles are reduced. During this learning program the number of cycles will become too low and the gas fails to ignite.



A retry is initiated by the IFC and the number of AC sine wave cycles is raised four steps up to increase the ignitor temperature.

If for some reason, flame is still not proven on this retry for ignition, the IFC then raise the AC Sine wave cycles four steps up.



If the flame is proven the IFC will keep this step setting. If flame is not proven the IFC locks out for one hour.

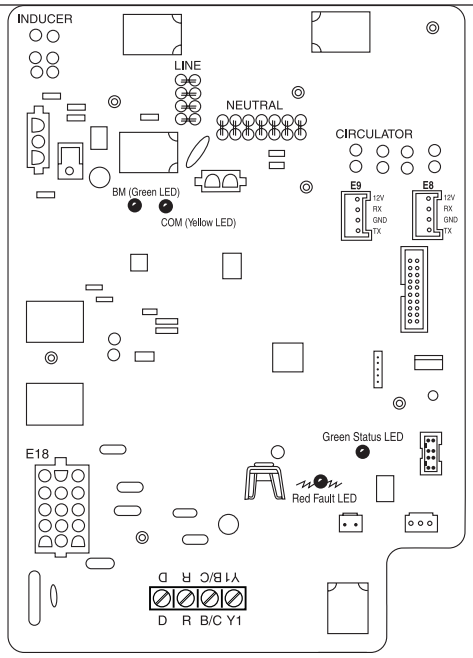
On a power interruption, the furnace control starts the igniter power at the high side of it's range and repeats the learning routine.

The furnace IFC will call for heat and a trial for ignition is initiated. If flame is not detected, the IFC will recycle the furnace two more times before lockout.

This learning process is employed to provide the most reliable ignition process and to extend the service life of the ignitor. This control requires the correct polarity of the 120 V.A.C. wiring and a ground connection. If the line voltage is low, or the line polarity is reversed, the IFC control will lock out the heating cycle and cause the Red Fault LED to flash six times.

This Ignitor can only be checked by using a OHM Meter and reading it's Resistance. A good ignitor reads 11-18 ohms. A bad ignitor will have a much higher resistance.

All information contained herein is subject to change without notice.



IFC LEDs

BM / Clock Signal LED Green

LED on when IFC Clock is working.

Communication (COM) LED Amber

LED ON when first powered up

LED Flashes the number of communicating components in the system

(ex. communicating stat and furnace will equal two flashes)

Status LED

Slow flash = no call for heat

Fast flash = call for heat

Fault LED

Will flash to signal a fault (see fault code chart)

Will flash the last four faults detected when the furnace is re-powered

Will only flash a fault code when the furnace is receiving a call for heat

"FAULT LED" Flash Codes	
2 Flash	External Lockout (Retries or Recycles exceeded)
3 Flash	Pressure Switch/Inducer Error
4 Flash	Open Limit Switch
5 Flash	Flame Sensed when no flame should be present
6 Flash	Reversed Polarity, or Ignitor (Triac) Fault
7 Flash	External Gas Valve Circuit Error
8 Flash	Low Flame Sense
9 Flash	Open Inducer Limit Switch
10 Flash	Communication Error
Solid ON	Internal GV IFC Error
Solid ON with Solid "STATUS" - ON	Internal IFC Error

IFC Inducer Learning Routine Sequence

- The furnace IFC will go through an Inducer Learning Routine for each stage of heat.
- The Learning Routine is done to determine the correct amount of ventilation air for complete combustion.
- Too much ventilation air will reduce the furnace's AFUE efficiency rating.
- The inducer motor's speed for each stage may be different for each installation due to the different length and size of the ventilation pipe, vent pipe, number of pipe fittings used, and the type of vent cap installed.
- The Inducer Learning Routine is repeated each time the furnace IFC does a **RESET** or is powered up and the furnace's IFC receives a call for heat.
- The furnace IFC checks the pressure switches PS-1 and PS-2. They both must be open before a heating cycle can begin.
- The furnace's IFC sends a digital signal to the Inducer Motor Drive Board, IMDB to run the inducer motor at the preset factory second stage heat RPM.
- The furnace's IFC looks for the PS-1 and PS-2 pressure switches to close. A 24 Volt A.C. Signal goes to the furnace IFC when a pressure switch closes.
- The furnace IFC will continue to signal the IMDB to increase the inducer speed in steps if PS-1 and PS-2 are not closed when the preset factory second stage heat RPM is reached. The maximum RPM for stage two is set at 4400 RPM, maximum RPM for stage one is set at 3600 RPM.

Fault Detection During Second Stage Heat Learning Routine

- If PS-1 and PS-2 are not closed when the inducer reaches 4400 RPM the furnace IFC will signal the IMDB to shut down the inducer motor. The IFC flashes its Red Fault LED three times repeatedly for thirty seconds.
- This thirty second inducer off period is done so any accumulated water that may be in the vent system can drain out. The IFC will repeat this cycle three times if needed before it locks out for one hour. (See Trouble Shooting Pressure Switch procedure.)
- After the thirty second off period the IFC will stop flashing the Fault LED and then will signal the IMDB to again start the inducer motor and go to the preset factory second stage heat RPM.

All information contained herein is subject to change without notice.

- When PS-1 and PS-2 switches do close the furnace IFC will then start the ignition cycle.
- The IFC now starts the Igniter warm up cycle. (See Silicon Nitride Ignitor Learning Routine.)
- Near the end of the warm up cycle the furnace IFC will turn on the Gas Valve.
- When the burner flame is detected by the furnace IFC, a forty-five second time delay for indoor blower operation begins. The forty-five second time delay allows the heat exchanger and the recuperative cell to warm up. By the end of this delay time, the inducer's discharge air temperature will be at its operating temperature and the density of the products of combustion will stabilize.
- The furnace IFC now signals the V.S. indoor blower to run at the programmed second stage heating airflow.
- The furnace IFC will now start its inducer second stage heat airflow learning routine.
- The furnace IFC will signal the Inducer Motor Control Board, IMCB, to begin to reduce the Inducer Motor speed in steps. Inducer motor speed is reduced until the furnace IFC sees PS-2 open.
- When PS-2 opens, the furnace IFC will **NOTE** the Inducers Motor RPM.
- The furnace IFC then adds an additional number of RPM to the inducer's motor second stage **NOTED** RPM.
- The additional number of RPM plus this **NOTED** RPM is the **learned** second stage inducer operating RPM.
- The furnace IFC now stores this learned operating inducer RPM for second stage heat in its memory.
- The furnace IFC will use this stored **learned** operating inducer RPM for second stage heat calls it receives in the future.
- If the furnace IFC is still receiving only a call for first stage operation, it will now start the learning routine for first stage.
- The furnace IFC will then continue to reduce the inducer motor's RPM in steps until the furnace IFC sees PS-1 open.
- When PS-1 opens the furnace IFC will **NOTE** this Inducer Motor RPM.
- The furnace IFC then adds an additional number of RPM to the first stage **NOTED** RPM.
- The furnace IFC now stores this **learned** operating inducer RPM in its memory and uses it for first stage heat calls it receives in the future.
- The IFC will now signal the Inducer Motor Drive Board (IMDB) to increase the Inducer Motors, IMDB, and speed to its **learned** RPM for first stage operation.
- The IFC signals the indoor V.S. blower to operate at the programmed first stage heating airflow.
- Whenever the furnace is powered up or after a **RESET**, the furnace IFC will not go through a learning routine for the third stage of heat until it receives a call for the third stage of heat.

Third Stage Inducer Learning Routine

- When the furnace IFC receives a digital signal for the third stage of heat from the comfort control thermostat, it will begin the inducer motor learning routine for third stage heat.
- The furnace will start the heating cycle in second stage, if not already on, and then begin the third stage learning routine.
- The furnace checks Pressure Switch Three, PS-3, it must be open.
- When the furnace IFC sees PS-3 open, it will send a digital signal to the Inducer Motor Drive Board, IMDB to run the inducer motor at the preset factory third stage RPM.
- The furnace IFC looks for the PS-3 pressure switch to close
- The furnace IFC will continue to signal the IMDB to increase the inducer motors speed in steps if PS-3 does not close when the preset factory third stage RPM is reached. The maximum RPM for the third stage heat is set at 5200 RPM.
- If PS-3 is not closed when the Inducer reaches 5200 RPM, the furnace IFC will signal the IMDB to reduce the inducer motor speed in steps to its second stage **LEARNED SPEED**. The furnace IFC flashes its Red Fault LED three times repeatedly. No Alert message is sent to the comfort control thermostat.The furnace IFC will keep operating at second stage of heat until the thermostat sends a different signal.
- When the furnace IFC sees PS-3 close, it signals the V.S. indoor blower to operate at its third stage heating airflow.
- The furnace IFC enters a time delay so the heat exchanger and the recuperative cell warms up to its third stage operating temperature. At the end of this time delay, the inducer's discharge air temperature will be at its third stage operating temperature and the density of the products of combustion will be stabilized.
- The furnace will now signal the IMDB to reduce the inducer speed in steps until PS-3 opens.
- When PS-3 opens the furnace IFC will **NOTE** this Inducer Motor RPM.
- The furnace IFC then adds an additional number of RPM to the third stage **NOTED** RPM.
- The furnace IFC will now store this **learned** operating inducer RPM in its memory and use it for third stage heat calls it receives in the future.
- The IFC will now signal the Inducer Motor Drive Board to increase the Inducer Motors speed to its **learned** RPM for third stage operation.

All information contained herein
is subject to change without notice.

Faults Detected During Third Stage Learning Routine

- If PS-3 is closed, the furnace IFC will send a signal to the IMDB to slow down the Inducer Motor in steps trying to get PS-3 to open. The furnace IFC will reduce the Inducer Motor's speed in steps until Pressure Switch, PS-2 opens. If PS-3 does not open when this speed is reached, the furnace IFC will again signal the IMDB to increase the Inducer Motor back to the second stage **LEARNED Speed**. The furnace IFC then starts flashing its Fault LED three times repeatedly. No Alert message is sent to the comfort control thermostat. The furnace IFC will keep operating the furnace at its second stage of heat. After operating this way for one hour, the furnace IFC will again check to see if PS-3 is open or can be opened. If PS-3 is now open or can be opened, the furnace IFC will go through its learning routine for third stage heat. The furnace IFC will stop flashing its Fault LED.

When the Comfort Control Thermostat is Satisfied

- When the furnace IFC receives a signal to go down to a lower stage of operation, it will signal the Inducer Motor Drive Board (IMDB) to lower the speed of the Inducer Motor in steps to the learned speed for that stage of operation.
- When the comfort control thermostat is satisfied, it will send a new digital signal to the furnace IFC to shut down the heating cycle.
- The furnace IFC now turns off the gas valve.
- When the furnace IFC sees the burners have shut down (no flame current), it will begin the time delay period to off for the inducer motor purge cycle and the V.S. Indoor Blower heat exchanger cool down cycle.

(Contingency Mode) Stand Alone Operation

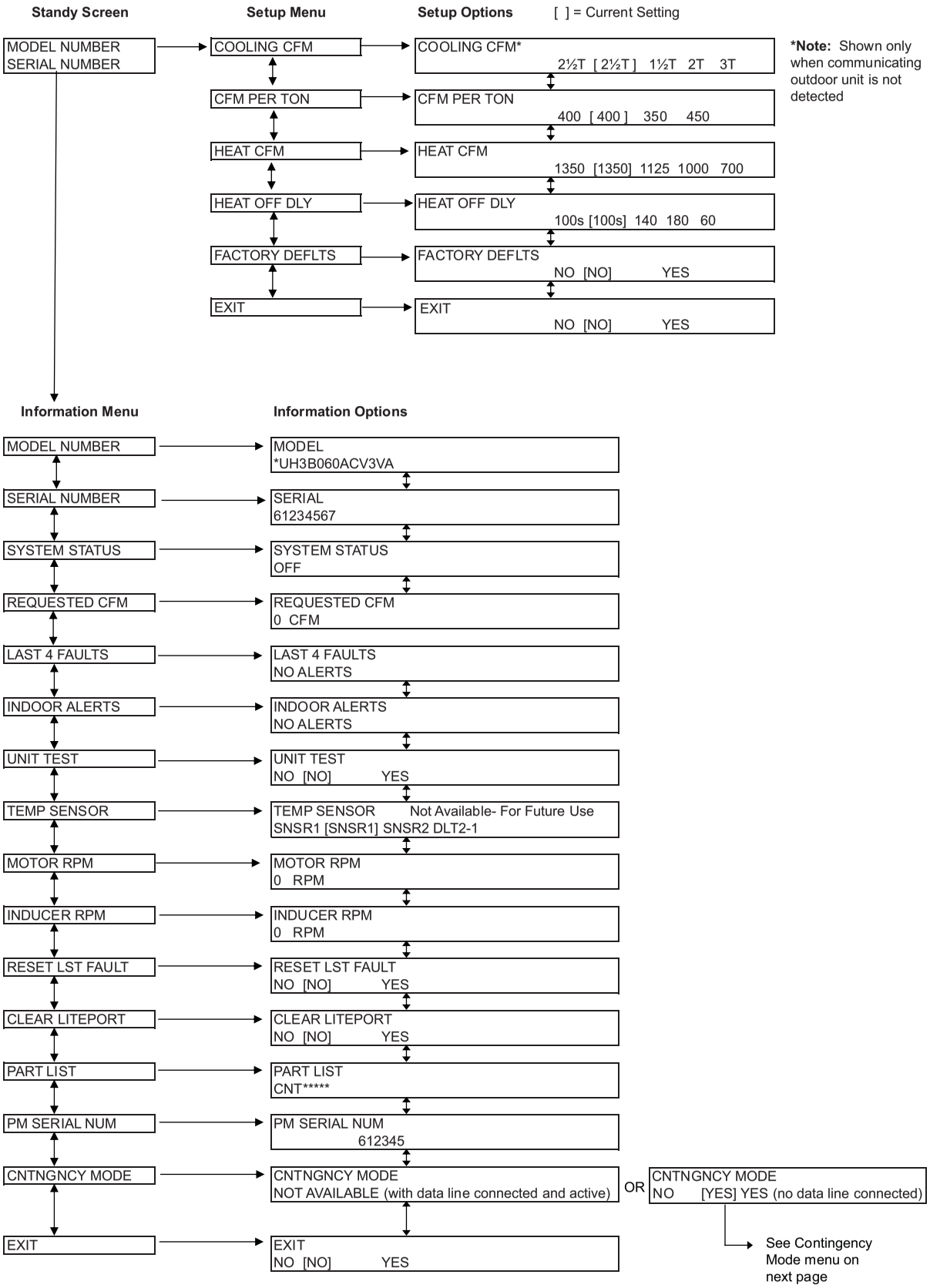
- Stand Alone Operation can only be entered at the User Interface Assembly.
  1. Stand Alone Operation can be set up to operate the furnace in **Heating Only**.
  2. When the thermostat is **not** communicating with the furnace IFC. Disconnect the Data wire D from the furnace IFC terminal block.
  3. When the furnace IFC is **not** flashing a fault code at its Fault LED.
- Turn 120 VAC power off. When the Green LED on the Inducer Drive Motor Board goes out, turn 120 VAC power back on.
- Scroll down using the down arrow ▼ at the User Interface Display until you see **CNTNGNCY Mode** then press the **Enter** button.
- **CNTNGNCY Mode** and ◄ **STAGE** ► will be displayed. Press the **Enter** button.
- **STAGE** and ◄ **OFF (OFF)** will be displayed. A First, Second or Third stage of heat must be selected. Use the ◄ or ► arrows to select the stage of heat wanted and then push the **Enter** button and then the ▼ button.
- **DUTY CYCLE** and **10%** will be displayed. A duty cycle **must** now be selected from 10 to 50%. A 10% duty cycle will run the furnace for 2 minutes and then off for 18 minutes. A 50% duty cycle will run the furnace for 10 minutes and then be off for 10 minutes. These duty cycles will be repeated 3 times per hour. Use the ◄ or ► arrows to select a duty cycle and then push the **Enter** button and then the ▼ button.
- **Start** and **NO (NO)** will now be displayed. With a **NO/NO** question being asked. Use the ◄ or ► arrows to select the **YES** and then press **ENTER**.
- **Are you Sure and NO (NO)** will now be displayed. With a **NO/NO** question being asked. Use the ◄ or ► arrows to select the **YES** and then press **ENTER**.
- Turn 120 VAC power off. When the Green LED on the Inducer Drive Motor Board goes out, turn 120 VAC power back on.
- When the furnace is operating in the Contingency Mode (Stand Alone Operating Cycle), the User Interface will display the following information: The top line will say **CNTNGNCY Mode**. The bottom line will show the operating stage number **STG (1, 2, or 3)** selected, and the percent number **10-50 %** selected.
- All furnace operating limits, pressure switches and communications between the IFC and the IMDB, and the V.S. Indoor Blower will be monitored for proper safe operation of the furnace.
- The ◄ ► ▲ ▼ and **ENTER** buttons do not function in the contingency mode of operation. To exit the Contingency Mode of operation, turn off the 120VAC power to the furnace.
- The Contingency Mode (Stand Alone Operation) will stop for any of the following reasons:
  1. A signal is received from the thermostat, Data wire D from the thermostat reconnected to the furnace IFC D terminal block.
  2. Power removed from the furnace and then turned back on.
  3. The furnace IFC enters a RESET mode of operation.
  4. A fault is detected by the furnace IFC. Fault LED will be flashing a fault code.

*Inducer RPM		
	Minimum RPM	Maximum RPM
Stage 1	1200	3600
Stage 2	1500	4400
Stage 3	2300	5200

***Inducer RPM are the same for all models.**

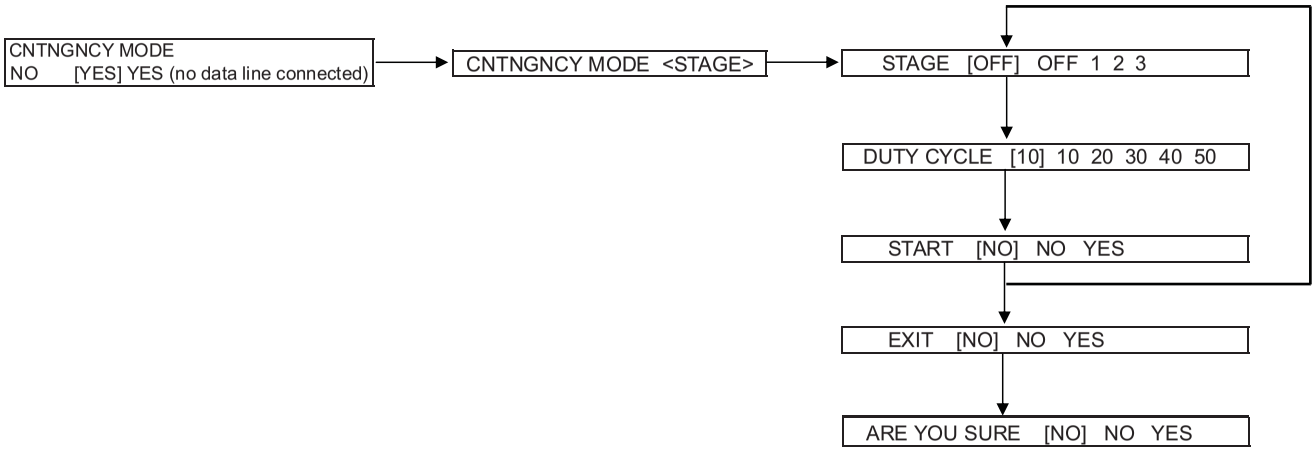
All information contained herein is subject to change without notice.

Interface Display Troubleshooting



All information contained herein is subject to change without notice.

Interface Display Troubleshooting (continued)


CNTNGNCY MODE
NO [YES] YES (no data line connected)
CNTNGNCY MODE <STAGE>
STAGE [OFF] OFF 1 2 3
DUTY CYCLE [10] 10 20 30 40 50
START [NO] NO YES
EXIT [NO] NO YES
ARE YOU SURE [NO] NO YES

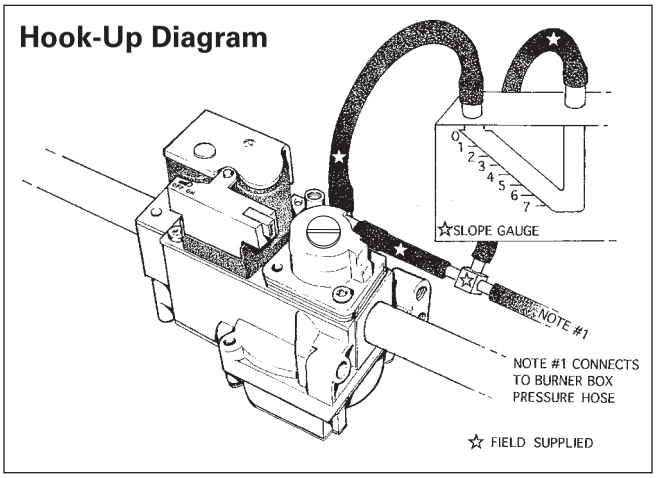
Note:
Contingency Mode Setup and Operation is explained on page 21.

All information contained herein is subject to change without notice.

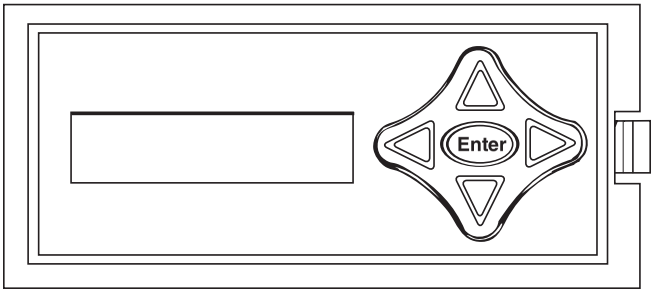
Three Stage Gas Valve Manifold Pressure Adjustment Procedures

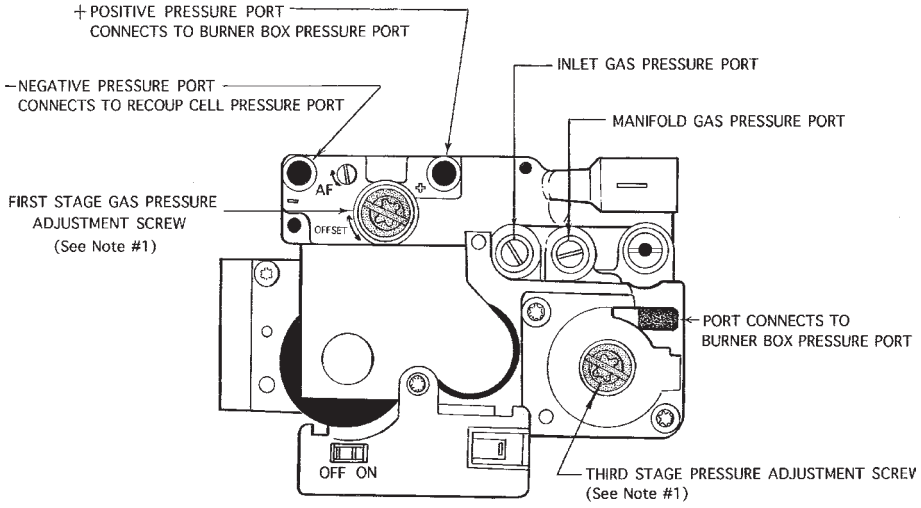
- Turn off the 120VAC power to the furnace.
- Turn the screw inside the Manifold Gas Pressure Port once counter-clockwise to open the port.
- Connect a field supplied U Tube Manometer, with field supplied rubber tubes and tees, to the three stage furnace as shown in the hook-up diagram.
- Remove the thermostat wire from the furnace's IFC D terminal.
- Apply 120 VAC power to the furnace. The furnace User Interface will display **WAIT**, then, **model and serial number**.
- Set up the furnace in the **contingency mode** of operation at the User Interface Assembly for the first stage of **heat** with a **50% duty cycle**. (See contingency mode of operation for additional details)
- **Remove 120 VAC power from the furnace. DO NOT re-power the furnace until the Green LED on the Inducer Motor Drive Board goes out**.
- Apply 120 VAC power to the furnace. The furnace User Interface will display WAIT, and then the display will change to the **"Contingency Mode STG 1 50%**.
- Let the furnace go through First Stage learning routine and its temperature rise stabilize. The temperature rise and learning routine will take four minutes.
- Read the first stage manifold gas pressure after the furnace's temperature rise has stabilized.
- If needed, adjust the gas valve's first stage of heat pressure adjustment screw to obtain the correct first stage pressure. Use Final Manifold Pressure Settings table for the correct first stage pressure reading in inches of Water Column pressure.

Hook-Up Diagram



User Interface Assembly




+ POSITIVE PRESSURE PORT CONNECTS TO BURNER BOX PRESSURE PORT
– NEGATIVE PRESSURE PORT CONNECTS TO RECOUP CELL PRESSURE PORT
INLET GAS PRESSURE PORT
MANIFOLD GAS PRESSURE PORT
FIRST STAGE GAS PRESSURE ADJUSTMENT SCREW (See Note #1)
AF
OFFSET
PORT CONNECTS TO BURNER BOX PRESSURE PORT
OFF ON
THIRD STAGE PRESSURE ADJUSTMENT SCREW (See Note #1)

Note #1 Dust Cap Cover Removed for gas pressure adjustment.
Replace Dust Caps when adjustments are complete and the manifold pressure is being read.

All information contained herein is subject to change without notice.

Three-Stage Gas Furnace

Furnace Input Rate (KBTU/hr)	FINAL MANIFOLD PRESSURE SETTING (inches W.C.)		
	1st Stage	2nd Stage	3rd Stage
60	0.7 ± 0.2	Not Adjustable	3.5±0.2
80	0.7 ± 0.2	Not Adjustable	3.5±0.2
100	0.7 ± 0.2	Not Adjustable	3.5±0.2
120	0.7 ± 0.2	Not Adjustable	3.5±0.2
Manifold pressures apply for Natural Gas & Propane applications			

Note: Gas valve adjustment and manifold pressure settings on these model furnaces will be the same for both Natural Gas and LP. The only change to the furnace for operation to LP will be burner orifices (#51 for LP). Refer to LP Conversion instructions for more detailed information.

First Stage Adjustment: Clockwise To Decrease Or Counter-Clockwise To Increase Pressure.

- Once the first stage gas pressure is adjusted, turn the gas valve switch to the OFF position. Operate the furnace for two more minutes to cool down the heat exchanger.
- The furnace IFC will stop the first stage 50% duty heating cycle after ten minutes. To manually exit the first stage contingency cycle, remove 120 VAC power from the furnace.
- **DO not re-power the furnace until the Green LED on the Inducer Motor Drive Board goes out.**
- Turn the gas valve switch to the ON position.
- Again, turn on the 120 VAC power to the furnace.
- Set up the furnace in the **CONTINGENCY MODE** of operation at the **User Interface Assembly** for the third stage of heat with a **50% duty cycle**, then depower and then repower the furnace.
- Let the furnace go through the stage 3 learning routine and its temperature rise to stabilize. This temperature rise and learning routine will take three to four minutes.
- The dust cap screw covering the third stage pressure adjustment screw must be in place during manifold gas pressure readings. Remove the dust cap and adjust the gas valve third stage of heat pressure adjustment screw, one turn.

Third Stage Adjustment: Counter-Clockwise To Decrease Or Clockwise To Increase Pressure.

Replace and tighten the dust cap for the third stage adjustment screw and then read the manifold pressure again. This procedure may need to be repeated until the manifold gas pressure is 3.5" of Water Column pressure.

- Once the third stage gas pressure is adjusted, turn the gas valve switch to the OFF position. Operate the furnace for two more minutes to cool down the heat exchanger.
- **Remove 120 VAC power from the furnace. DO not re-power the furnace until the Green LED on the Inducer Motor Drive Board goes out.**
- Turn the gas valve switch to the ON position.
- Again, operate the furnace in the contingency mod of operation in first stage of heat with a 50 % duty cycle. Re-adjust the first stage pressure adjustment screw if the adjustment of the third stage adjustment affected the first stage setting. If the first stage pressure adjustment screw setting is now changed, you will have to again go to the third stage heat and check its operating pressure. If the third stage operating gas pressure has again changed, you will have to adjust it again and then recheck the first stage operating gas pressure. Adjust the first stage and third stage pressure adjustment screws until minimum interaction between the two are seen.
- When the correct operating gas valve pressures are obtained, turn the furnace off. Remove the field supplied manometer tubing and the tee installed at the beginning steps and TIGHTEN DOWN THE MANIFOLD DUST CAPS and the GAS PRESSURE PORT SCREW. Reconnect the thermostat data line to the D terminal of the furnace. Turn on the 120V power to the furnace. With the thermostat data line connected to the furnace and communications between the thermostat and the furnace re-established, the furnace operation will now be controlled by the comfort control thermostat.

INPUT RATING BTUH	NUMBER OF BURNERS	MAIN BURNER ORIFICE DRILL SIZE	
		NAT. GAS	LP GAS
60,000	3	45	51
80,000	4	45	51
100,000	5	45	51
120,000	6	45	51

Valve	Supplier	Opening Characteristics	Propane Convertible	Gas Valve	LP Kit
1	Honeywell	Three Stage	Yes (burner orfices only)	VAL08715	BAYLPKT220A

Unit Test Cycle

A qualified technician can cycle the variable speed indoor blower and the three stage gas furnace through its three stages of heat at the User Interface Assembly.

- The Unit Test Cycle will be entered at the User Interface assembly.
- The test cycle can only be entered when the thermostat is not calling and the furnace IFC is not reporting a fault. Disconnect the Data wire D from the furnace IFC terminal block to ensure the Unit Test Cycle will not be interrupted.

All information contained herein is subject to change without notice.

- Scroll down using the ▼ button at the User Interface Display until you see **UNIT TEST**, then press **ENTER**.
- **UNIT TEST** and ◄ **NO (NO)** ► will be displayed. Use the ◄ or ► arrow button to change the **NO** to a **YES** and then press **ENTER**.
- **ARE YOU SURE** and **NO (NO)** will now be displayed. Use the ◄ or ► arrow button to change the **NO** to a **YES** and then press **ENTER**.
- **UNIT TEST** and **STAGE OFF** will now be displayed. The variable speed indoor blower will then be turned on by the IFC for 10 seconds and then off.
- **UNIT TEST** and **STAGE OFF** will now be displayed. The Furnace IFC will now start the variable speed inducer motor and then go through the igniter warm up cycle. The Furnace IFC will turn on the gas valve and when the burner flame is detected the user interface display will change.
- **UNIT TEST** and **STAGE 2** will now be displayed. The furnace IFC will now be in second stage heat, and 45 seconds after flame is detected, the furnace will call for the variable speed indoor blower.
- **UNIT TEST** and **STAGE 3** will now be displayed. The furnace IFC will ramp up the variable speed inducer motor and the indoor variable speed blower to third stage operation for a few seconds.
- **UNIT TEST** and **STAGE 1** will now be displayed. The furnace IFC will ramp down the variable speed inducer motor and the indoor variable speed blower to first stage operation for a few seconds.
- The **Model** and **Serial Number** will now be displayed. The variable speed indoor blower will now be operated for the heat exchanger cool down cycle and then be turned off.
- Reconnect the Data wire to the D terminal of the furnace IFC.

All information contained herein
is subject to change without notice.

Vent Length Table for Variable Speed Vent Motor Models Only

Maximum Vent Length Table
(Installation instructions must be followed for installation of the venting system)

	Maximum Vent Length (Equivalent Feet)			
Direct Vent (2 Pipe System)				
Models *UC1/*DC1 & *UX1/*DX1	**2" Pipe**	**2.5" Pipe**	**3" Pipe**	**4" Pipe**
*UC1/*UX1-040/060	60	80	100	130
*UC1/*UX1-080	50	80	100	130
*UX1C080A9601	See Note 1	60	100	130
*UC1/*UX1-100	See Note 1	40	100	130
*UC1/*UX1-120	See Note 1	15	60	130
*DC1/*DX1-040	60	80	100	130
*DC1/*DX1-060	50	80	100	130
*DC1/*DX1-080	45	80	100	130
*DC1/*DX1-100	See Note 1	80	100	130
*DC1/*DX1-120	See Note 1	15	60	130
Non-Direct Vent (1 Pipe System)				
*UC1/*UX1 & *DC1/*DX1-040/060	50	80	80	130
*UC1/*UX1 & *DC1/*DX1-080	40	80	80	130
*UX1C080A9601	See Note 1	60	80	130
*UC1/*UX1-100	See Note 1	40	80	130
*UC1/*UX1 & *DC1/*DX1-120	See Note 1	25	70	130
*DC1/*DX1-100	See Note 1	80	80	130
For *UH3 and *DH3 Propane Applications- See Notes 6-9				
Models *UY/*DY & *UX/*DX-R *UX2/*DX2 & *UH2/*DH2 *UX3/*DX3 & *UH3/*DH3	**2" Pipe**	**2.5" Pipe**	**3" Pipe**	**4" Pipe**
Altitude/Altitude 0-7,000 FT./PI (0-2134 M)				
060	200 (Note 6)	200 (Note 6)	200 (Note 7)	200 (Note 7)
080	50 (Note 6)	120 (Note 6)	200 (Note 7)	200 (Note 7)
100	See Note 1	60 (Note 6)	200 (Note 7)	200 (Note 7)
120	See Note 1	See Note 1	200 (Note 7)	200 (Note 7)
*DH3/*DX3-120 (Propane)	See Note 1	See Note 1	100	100
Altitude/Altitude 7,000 FT./PI - 9500 FT./PI (2134 M-2896 M)				
060	100 (Note 6)	100 (Note 6)	100 (Note 8)	100 (Note 8)
080	25 (Note 6)	60 (Note 6)	100 (Note 8)	100 (Note 8)
100	See Note 1	30 (Note 6)	100 (Note 8)	100 (Note 8)
120	See Note 1	See Note 1	100 (Note 8)	100 (Note 8)
*DH3/*DX3-120 (Propane)	See Note 1	See Note 1	50	50
Altitude/Altitude 9,500 FT./PI - 12,000 FT./PI (2896 M-3658 M)				
060	50 (Note 6)	50 (Note 6)	50 (Note 9)	50 (Note 9)
080	See Note 1	30 (Note 6)	50 (Note 9)	50 (Note 9)
100 & 120	See Note 1	See Note 1	50 (Note 9)	50 (Note 9)
*DH3/*DX3-120 (Propane)	See Note 1	See Note 1	25	25

Notes

1. Not allowed.
2. Minimum vent length for all models: 3′ horizontal and vertical.
3. The INLET Air of one pipe systems require the installation of a 90″ elbow (to prevent dust and debris from falling straight into the furnace) and a 2′ horizontal or vertical straight pipe section connected below the elbow.
4. This appliance requires a special venting system. Refer to installation instructions for parts list and method of installation.
5. * letter may be "A", "C", or "T"
6. Use of vent pipe smaller than 3″ in diameter is not permitted for *UH3 & *DH3 models in propane applications.
7. Maximum vent length is 150′ for *UH3 & *DH3 models in propane applications at an altitude of 0-7,000 feet.
8. Maximum vent length is 100′ for *UH3 & *DH3 models in propane applications at an altitude of 7,000-9,500 feet.
9. Maximum vent length is 38′ for *UH3 & *DH3 models in propane applications at an altitude of 9,500-12,000 feet.

Additional Notes:

1. One SHORT radius 90 elbow is equivalent to 10′ of 3″ pipe and one LONG radius elbow is equivalent to 6′ of 3″ pipe. One 90 elbow is equivalent to 7.5′ of 2 1/2″ pipe and 5′ of 2″ pipe. Two 45 elbows equal one 90 elbow.
2. The termination tee or bend must be included in the total numbers of elbows. If BAYVENT100A termination kit is used, the equivalent length of pipe is 5 feet.
3. Pipe adapters are field supplied (except 120).
4. Low temperature icing on vent inlet or termination may cause pressure switch problems.

All information contained herein is subject to change without notice.

Three-Stage Gas Furnace

Furnace Sequence of Operation

The comfort control thermostat signals **(17)** the Furnace IFC for First Stage Heat. **(16)**

IFC checks all limits **(10)** & Pressure Switches PS-1, 2, 3. **(9)**

IFC signals the Variable Speed Inducer Drive, IMDB **(8)** to start the Vent Motor **(8)** and go to its second stage speed.

Furnace always lights off in second stage. **(9)**

IFC sees 24 Volt AC signal from Pressure Switches PS-1 & PS-2 when they close. **(9)**

This proves Vent Motor is moving the correct amount of combustion air through the furnace and vent system.

IFC starts the Hot Surface Igniter learning routine warm-up time cycle. **(6)**

IFC turns on the Gas Valve **(11)**. Trial for Ignition is five seconds.

The IFC proves Ignition by the flame current sensing method **(7)**. If flame is not detected, the IFC will cycle the furnace three times to try and prove flame and then the IFC locks out for one hour. The IFC will send an Alarm Code. It will also flash its Red Fault LED two times repeatedly.

If flame is detected, the IFC will start the heat exchanger warm-up time delay for the indoor blower.

45 Seconds later the IFC signals the Indoor Blower **(4)** to come on and run at its second stage heat speed.

The IFC then signals the Inducer Motor Drive Board, IMDB, **(8)** to ramp down the vent motor in steps to the first stage vent motor speed. This reduction in steps of the Vent Motor Speed will cause the Gas Flow through the Gas Valve to go down in steps which will reduce the chances of a burner flame out. When the IFC sees the 24 Volt AC signal from Pressure Switch # 2 (PS-2) **(9)** go away, it will then signal the Indoor Blower **(4)** to go to the First Stage Heat speed.

The comfort control thermostat **(17)** will continue to call for first stage heat operation until the indoor temperature is back at the comfort control thermostat set point or, if the comfort control thermostat **(17)** sees the indoor temperature is not moving back towards its set point in time or the indoor temperature is still moving away from comfort control thermostat set point, it will Signal the IFC **(17)** to go to second stage heat. The comfort control thermostat **(17)** then signals the Furnace IFC for second Stage Heat.

The IFC **(8)** signals the Inducer Motor Drive Board, IMDB, **(8)** to ramp the Vent Motor up in steps to its Learned Second Stage RPM speed.

AS the Vent Motor **(8)** speed increases, the amount of gas coming through the gas valve will increase.

When the IFC sees the 24 Volt AC Signal from Pressure Switch #2, PS-2, **(9)** closing, the IFC will then signal the Indoor Blower **(4)** to go to its Second Stage Heat Speed.

The comfort control thermostat **(17)** will continue to call for second stage heat operation until the indoor temperature moves back toward its set point. Before the indoor temperature reaches the comfort control thermostat **(17)** set point, the thermostat will signal the Furnace IFC to go back to first stage operation.

Or, if the comfort control thermostat **(17)** sees the indoor temperature is not moving back towards its set point in time, or the indoor temperature is still moving away from thermostat's set point, it will signal the furnace IFC to go to Third Stage Heat.

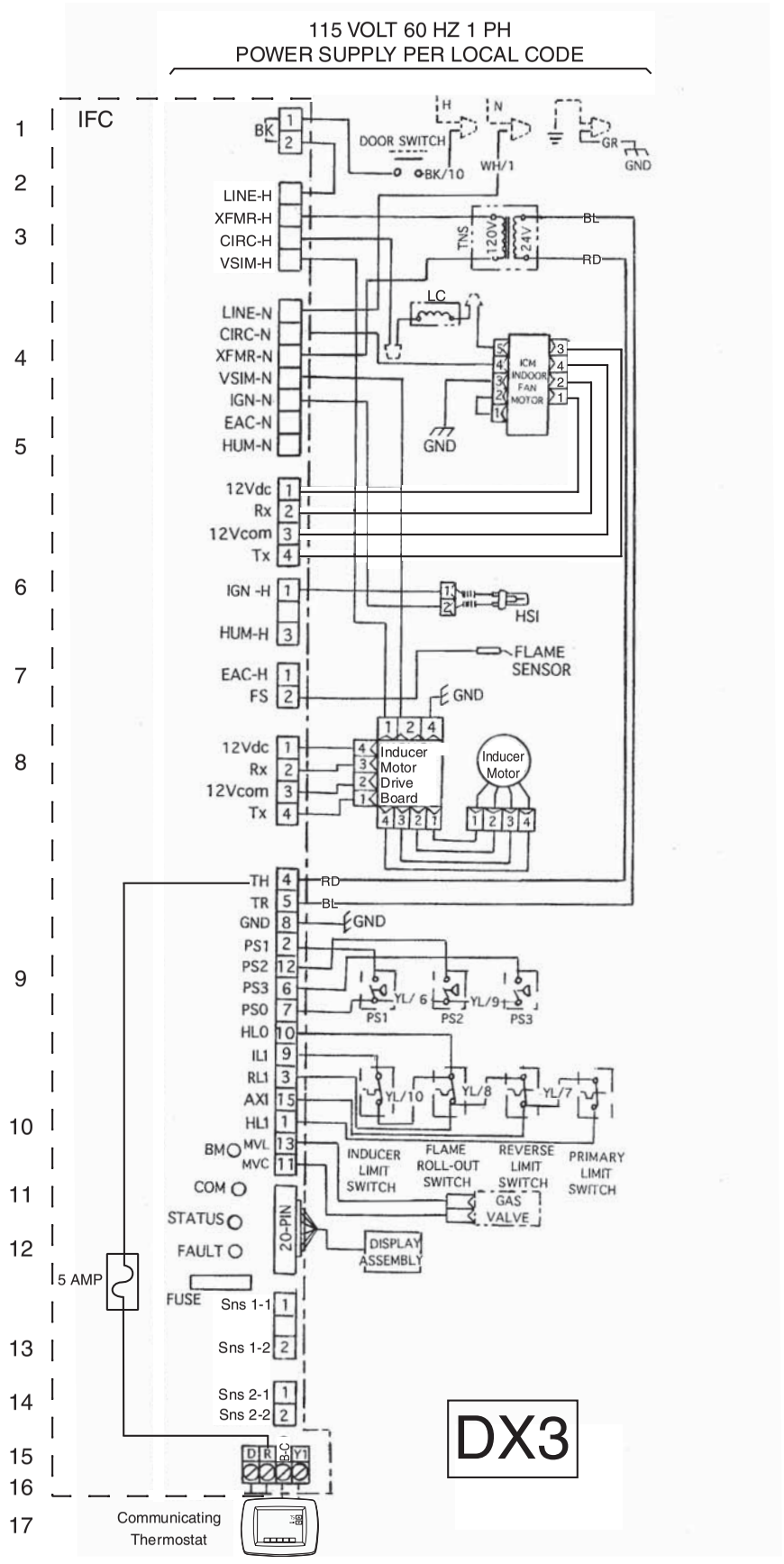
The IFC signals the Inducer Motor Drive Board, IMDB **(8)** to ramp the vent motor in steps to its learned third stage RPM speed.

As the Vent Motor Speed increases, the amount of gas coming through the gas valve will increase.

When the IFC sees the 24 Volt AC Signal from Pressure Switch 3, PS-3 **(9)** closing, the IFC will then signal the indoor blower **(4)** to go to its Third Stage Heat speed.

The comfort control thermostat will continue to monitor the indoor temperature and send signals to the IFC to operate at different stages or go to off so it can maintain the indoor temperature at the homeowner's set point.

All information contained herein
is subject to change without notice.

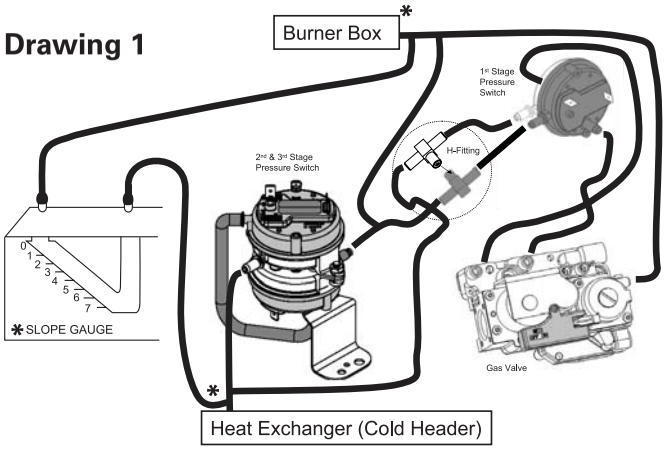


All information contained herein is subject to change without notice.

Pressure Switch Testing

1. Connect a slope gauge or magnehelical gauge to the recoup cell cold header and the burner box fittings using field supplied tees and hoses, see drawing # 1.

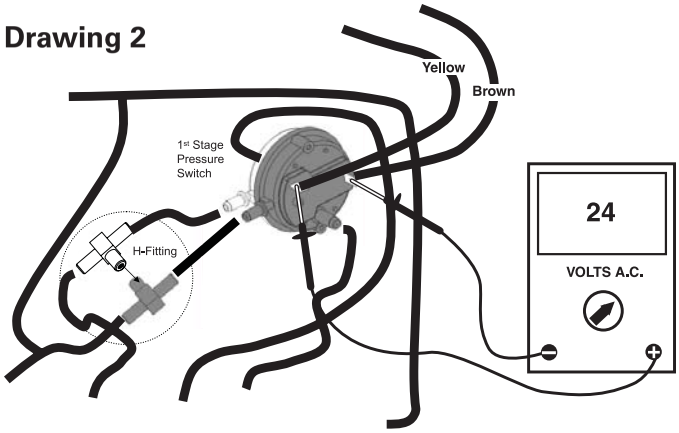
Drawing 1



***Field Supplied**

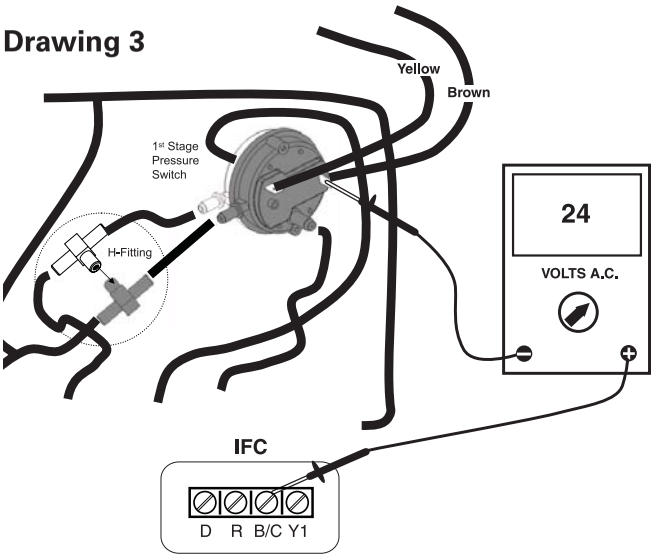
2. Connect an AC Volt Meter to the pressure switch being tested. Connect the meter leads to the pressure switch terminals, see drawing # 2. The AC Volt Meter should read 24 Volts AC, if the 24 Volts AC is present at the switch go to step #4, if the 24 Volts AC is not read go to step # 3.

Drawing 2



3. Check for 24 Volts AC coming to the pressure switch, see drawing # 3. Connect one lead of the AC Volt Meter to the B/C terminal of the gas furnace low voltage terminal board and the other AC Volt Meter lead will be connected to one pressure switch terminal (one at a time) to see if 24 Volts AC is being supplied to the pressure switch. If 24 Volts AC is present at both pressure switch terminals, the pressure switch is closed and it must be replaced. Check the following furnace's components if 24 Volts AC is not being supplied to the pressure switch; 5 amp fuse, transformer, wiring and the furnace IFC.

Drawing 3

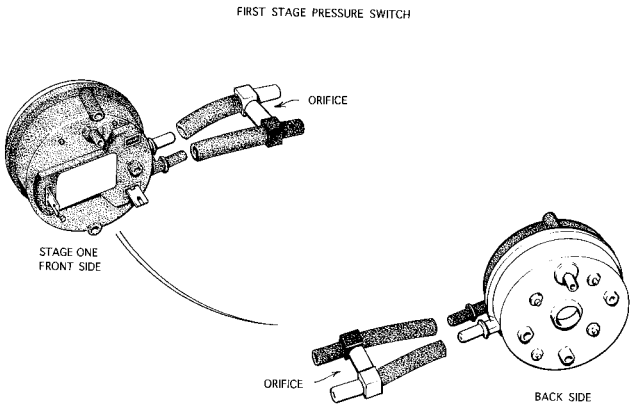


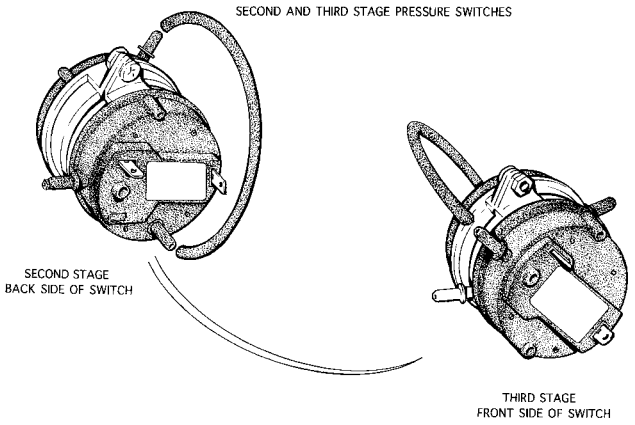
4. Set the comfort control thermostat to call for heat. Connect the AC Volt Meter to the pressure switch being tested, then go to step #5.

5. The AC Volt Meter should read 24 Volts AC until the inducer motor comes up to speed to create the operating pressure needed to close the switch. See the pressure switch(s) label being tested or the Gas Furnace Pressure Switch Matrix Chart for the switch's operating pressure. If the pressure switch being tested does not close when the operating pressure is reached, the switch must be replaced.

All information contained herein is subject to change without notice.

Pressure Switches And Interconnecting Hose Diagram



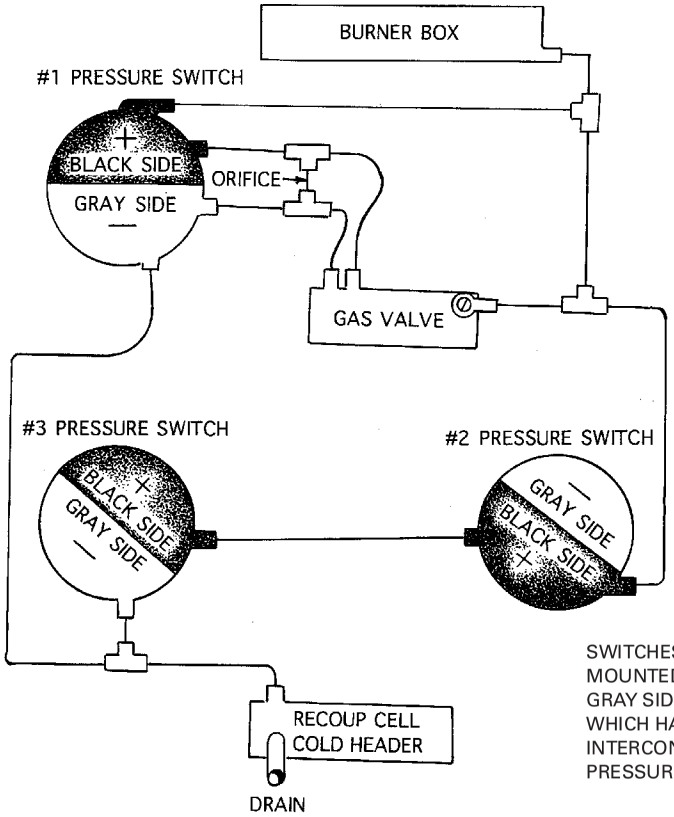


There is an orifice installed in the black tee. This tee & orifice assembly is connected to the black side of pressure switch #1. The orifice & tee assembly is not universal. **The orifice is sized for the furnace's BTU input capacity.**

Pressure switch #1 has two black and two gray pressure ports. The black side of pressure switch #1 is connected to the furnace's burner box. The gray side of the switch is connected to the recoupitive cells cold header tee.

The closing negative pressure, in inches of water column, is printed on the switch label.

These two switches are an assembly. Separate switches are not available.

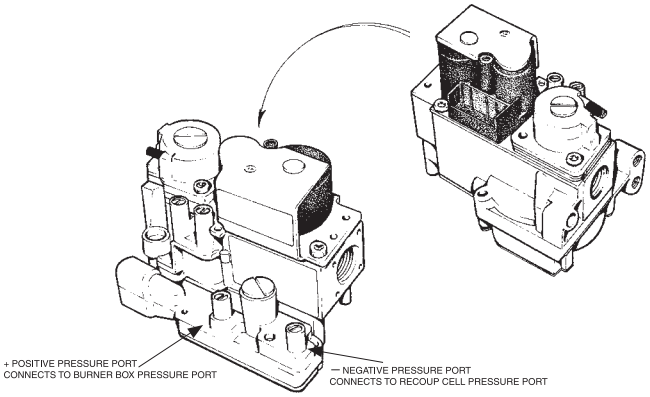


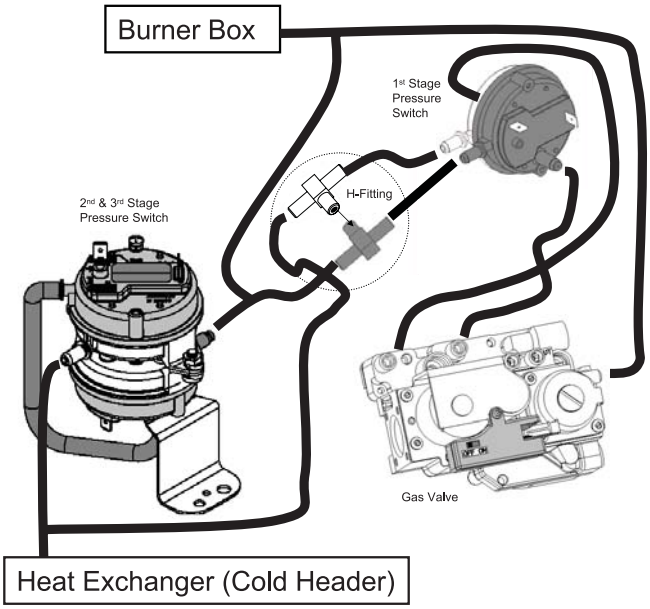
SWITCHES 2 & 3 ARE MOUNTED BACK TO BACK, GRAY SIDE TO GRAY SIDE, WHICH HAVE AN INTERCONNECTING PRESSURE PORT

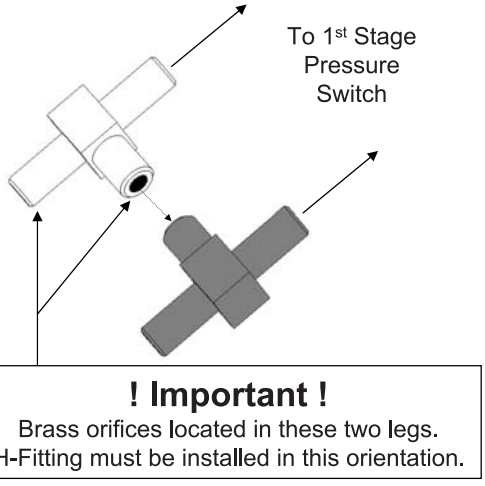
All information contained herein is subject to change without notice.

Honeywell Multi Stage Automatic Gas Valve

The gas furnace manifold gas pressure is modulated in steps by the pressure difference of the positive inlet burner air pressure and the negative outlet air pressure of the recuperative cell. These two pressures are connected to the gas valve. These two pressures are used to set the gas valve's pressure regulator for the correct operating pressure for the stage of operation being called for by the furnace IFC.


+ POSITIVE PRESSURE PORT
CONNECTS TO BURNER BOX PRESSURE PORT
– NEGATIVE PRESSURE PORT
CONNECTS TO RECOUP CELL PRESSURE PORT




To 1st Stage Pressure Switch
! Important !
Brass orifices located in these two legs.
H-Fitting must be installed in this orientation.

Furnace Input Rate (KBTU/hr)	FINAL MANIFOLD PRESSURE SETTING (inches W.C.)		
	1st Stage	2nd Stage	3rd Stage
60	0.7 ± 0.2	Not Adjustable	3.5 ± 0.2
80	0.7 ± 0.2	Not Adjustable	3.5 ± 0.2
100	0.7 ± 0.2	Not Adjustable	3.5 ± 0.2
120	0.7 ± 0.2	Not Adjustable	3.5 ± 0.2
Manifold pressures apply for both Natural Gas & Propane applications			

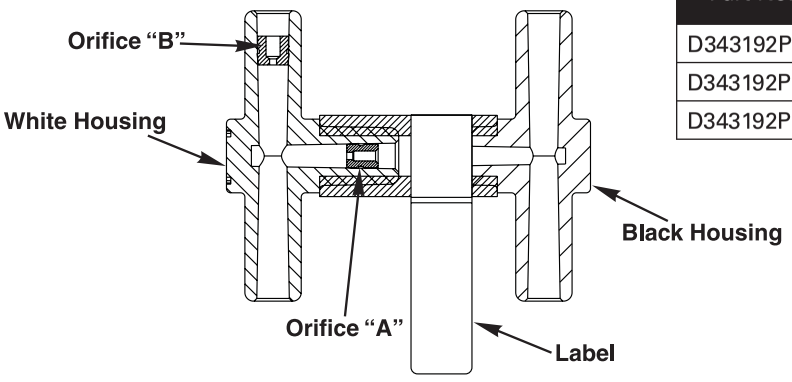
Note: Gas valve adjustment and manifold pressure settings on these model furnaces will be the same for both Natural Gas and LP. The only change to the furnace for operation to LP will be burner orifices (#51 for LP). Refer to LP Conversion instructions for more detailed information.

All information contained herein is subject to change without notice.

Gas Furnace Pressure Switch Matrix Chart

Model	Part ID	Replacement Part Number	Operating Pressure	Close/Open Range	MIN-MAX Inducer RPM	Factory Part Number	Color of H-Fitting Label
UH3B060AC	PS1	SWT03072	0.55" W.C.	± 0.05"W.C.	1200-3600	D342606P04	Blue
	PS2	SWT02978	0.88"W.C.	0.81/0.61"W.C.	1500-4400	C342634P61	
	PS3	SWT02978	1.60" W.C.	1.57/1.31"W.C.	2300-5200	C342634P61	
DH3B060AC	PS1	SWT03069	0.55" W.C.	± 0.05"W.C.	1200-3600	D342606P01	Blue
	PS2	SWT02978	0.88"W.C.	0.81/0.61"W.C.	1500-4400	C342634P61	
	PS3	SWT02978	1.60" W.C.	1.57/1.31"W.C.	2300-5200	C342634P61	
UH3B080AC	PS1	SWT03073	0.76" W.C.	± 0.05"W.C.	1200-3600	D342606P05	White
	PS2	SWT02979	1.25" W.C.	1.19/0.97"W.C.	1500-4400	C342634P62	
	PS3	SWT02979	2.25" W.C.	2.28/1.93"W.C.	2300-5200	C342634P62	
DH3B080AC	PS1	SWT03070	0.76" W.C.	± 0.05"W.C.	1200-3600	D342606P02	Yellow
	PS2	SWT02979	1.25" W.C.	1.19/0.97"W.C.	1500-4400	C342634P62	
	PS3	SWT02979	2.25" W.C.	2.28/1.93"W.C.	2300-5200	C342634P62	
UH3B100AC	PS1	SWT03073	0.76" W.C.	± 0.05"W.C.	1200-3600	D342606P05	White
	PS2	SWT02979	1.25" W.C.	1.19/0.97"W.C.	1500-4400	C342634P62	
	PS3	SWT02979	2.25" W.C.	2.28/1.93"W.C.	2300-5200	C342634P62	
DH3B100AC	PS1	SWT03070	0.76" W.C.	± 0.05"W.C.	1200-3600	D342606P02	White
	PS2	SWT02979	1.25" W.C.	1.19/0.97"W.C.	1500-4400	C342634P62	
	PS3	SWT02979	2.25" W.C.	2.28/1.93"W.C.	2300-5200	C342634P62	
UH3B120AC	PS1	SWT03074	0.65" W.C.	± 0.05"W.C.	1200-3600	D342606P06	Yellow
	PS2	SWT02980	1.25" W.C.	1.19/0.97"W.C.	1500-4400	C342634P63	
	PS3	SWT02980	2.10" W.C.	2.12/1.79"W.C.	2300-5200	C342634P63	
DH3B120AC	PS1	SWT03071	0.65" W.C.	± 0.05"W.C.	1200-3600	D342606P03	Yellow
	PS2	SWT02980	1.25" W.C.	1.19/0.97"W.C.	1500-4400	C342634P63	
	PS3	SWT02980	2.10" W.C.	2.12/1.79"W.C.	2300-5200	C342634P63	

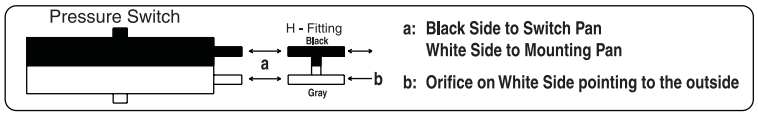
Note: The first stage pressure switch comes as an assembly with the H-Fitting connected to it.



Part No.	Honeywell Part No.	Orifice "A" +/-.005	Orifice "B" +/-.005	Label Color
D343192P01	50014119-001	.033	.032	White
D343192P02	50014119-002	.033	.035	Yellow
D343192P03	50014119-003	.033	.039	Blue

*From drawing #D343192

H-Fitting Label



All information contained herein is subject to change without notice.

Gas Furnace — Communicating Systems Trouble Shooting Checklist

Note: Alert, ERR, Codes will **only** be displayed at the thermostat when a call for heat is being sent by the thermostat. The Red LED will be ON at the thermostat. The Furnace IFC Status LED will be flashing fast; the Fault LED will be flashing a fault code.

Note: The * Alert number will not be displayed at the thermostat.

Comfort Control Alert	Fault LED	User Interface Display	Possible Causes
ERR 1	3 Flash	System Status- OFF Last 4 Faults- PS-1, 2, 3 Open or Closed	Pressure Switch, PS, # 1, 2 or 3 possible failure.
		PS-1 & 2 Open	Furnace Drain System stopped up.
		PS-1 & 2 Open	Inducer Motor Drive Board, or Inducer Motor.
		PS-1, 2 or 3 Open	Vent or Ventilation system problems.
ERR 4	8 Flash	System Status-OFF Last 4 Faults-Lo FLAME SNS	Flame Sensing Rod Coated, or failure. Burner not grounded good. Flame Sensing Rod position. Low Gas Pressure or IFC
ERR 10	6 Flash	System Status- OFF Last 4 Faults- IGNITOR Trica ERR	Ignitor Open or Wiring IFC failure
ERR 18	ON	System Status-OFF Last 4 Faults- CHECK CNTRL or CNTRL FAULT	IFC failure
ERR 22 Flame Detected Then lost	2 Flash	System Status-OFF Last Four Faults- RECYCLE LO RETRY LO	Low flame current, Flame Sensing Rod, Low gas pressure, Burner. The difference from ERR20 & ERR22 is Flame was detected and then lost with an ERR22.
ERR26	4 Flash	System Status-OFF AUX LIMIT or HIGH LIMIT	Dirty Filter, Blower motor Inoperative, wrong blower speed Duct Work Restrictions,
	9 Flash	System Status-OFF IND LIMIT	Furnace being over fired
	4 Flash	System Status-OFF AUX LIMIT LO HIGH LIMIT LO IND LIMIT LO	
ERR34	5 Flash	System Status-OFF FLAME ERROR	GAS Valve, IFC or Wiring
ERR87	4 Flash	System Status- OFF ROLLOUT OPEN ROLLOUT LO	Inducer Motor running slow, Vent or ventilation problem, Furnace being Over Fired.
ERR90	10 Flash	System Status-OFF SYS COMM CRC, or IND COMMM CRC, or BLW COMM CRC	Communications Errors EMI getting into control System, or wiring, or a control Component.
ERR93	ON	System Status-OFF EXT GV ERR INT GV ERR	Furnace wiring or jumper added Replace Furnace Control
ERR101	N.A.	System Status-?? Y1 OFF ERR Y1 ON ERR	Furnace IFC Furnace IFC

All information contained herein
is subject to change without notice.

Gas Furnace — Communicating Systems Trouble Shooting Checklist

Alert Codes (continued)

Comfort Control Alert	Fault LED	User Interface Display	Possible Causes
	N.A.	TWIN ERROR Not approved for V.S. models	Twinning Fault
	2 Flash	System Status-OFF Last 4 Faults- RECYCLE RETRY	Ignitor position, Wiring, Furnace IFC, Gas Valve, No Gas, Flame Sensing Rod, Burner
	6 Flash	System Status-OFF POLARITY ERR	I20 VAC power wires reversed (White and Black wires reversed)
	N.A.	System Status-On Or OFF AC VOLTS LO AC VOLTS HI	High or Low Voltage being Supplied to the Furnace
	6 Flash	System Status-OFF GND FAULT	Furnace not Grounded
	10 Flash	System Status-OFF SYS COMM ERR NO SYS CLK BLW COMM ERR IND COMM ERR	Thermostat, Field wire Furnace IFC V.S. BLOWER Motor, Inducer Motor Drive Board
	N.A.	System Status-OFF CHECK FUSE	
	N.A.	System Status-?? DATA BAD OD CAP ERR	Repower IFC / replace PM Check thermostat set up for O D Unit size.

All information contained herein
is subject to change without notice.